United States Department of the Interior
National Park Service

National Register of Historic Places Multiple Property Documentation Form

This form is used for documenting property groups relating to one or several historic contexts. See instructions in National Register Bulletin *How to Complete the Multiple Property Documentation Form* (formerly 16B). Complete each item by entering the requested information.

___X____ New Submission _____ Amended Submission

A. Name of Multiple Property Listing

Tie Cutting Industry of the North Slope of the Uinta Mountains, Utah (1867-1940s)

B. Associated Historic Contexts

(Name each associated historic context, identifying theme, geographical area, and chronological period for each.)

N/A

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D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR 60 and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.

_____ _____ _____
Signature of certifying official Title Date

_Utah Division of State History, Office of Historic Preservation__
State or Federal Agency or Tribal government

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

_____ _____
Signature of the Keeper Date of Action

Table of Contents for Written Narrative

Create a Table of Contents and list the page numbers for each of these sections in the space below.
Provide narrative explanations for each of these sections on continuation sheets. In the header of each section, cite the letter, page number, and name of the multiple property listing. Refer to *How to Complete the Multiple Property Documentation Form* for additional guidance.

Section E. Statement of Historic Contexts

Introduction

Through the work of archaeologist James E. Ayres, the history and archaeology of the Tie Cutting Industry of the North Slope of the Uinta Mountains has been investigated, promoted, and shepherded for decades. The tie cutting industry played not only the most significant role in the development and settlement of the North Slope of the Uinta Mountains, straddling the boundaries of Utah and Wyoming, but also assisted in the United States' first transcontinental railroad. Ties hewn from the richly timbered landscape of the North Slope supplied not only the initial construction of the Transcontinental Railroad in the 1860s through parts of Wyoming and Utah, but also the maintenance of this important trade and commerce corridor and all the expanded railroad lines throughout the region constructed between the 1880s and 1930s. As noted by Olson (1971:23), "Tie manufacture was often on a grand scale in the Rockies, and tie cutting was one of the most rugged and most lucrative jobs of the mountain frontier." From 1866 through the 1940s, loggers colloquially known as 'tie hackers' or 'tie cutters', selectively harvested lodgepole pine trees for the Union Pacific Railroad and associated ventures. Loggers transformed lodgepole pines primarily into ties for the railroad, but also bridge and trestle framing, mine props, utility poles, building material, and cordwood for both domestic and industrial use. With the area's unique location and environment, settlements did not establish long-term roots on the North Slope. Thus logging, primarily tie cutting, shaped the cultural and environmental landscape of the North Slope of the Uinta Mountains. Unlike other logging frontiers in the United States, the primary focus of this entire forested landscape was the procurement of railroad ties, with any other wood procurement as always a secondary emphasis. Tie cutters working on the North Slope contributed significant amounts of labor and material to the growth of the United States transportation, commerce, and economic infrastructure through use of their finished goods in railroad construction. [1]

Due to the North Slope's location in Utah, sandwiched between a vast mountain range and a state border, there is remarkably little historical information on the tie cutting industry of the 19th and 20th century. Only on two pages in the 1930 Federal Census of Summit County, Utah of the federal censuses between 1870 and 1940 capture any information on the residents of this region, as this area largely fell into a no-man's land. Wyoming census takers ended their tallies at the state border while their counterparts in Utah, recording in Summit County before 1930 never ventured any further than the towns of Kamas, Echo, or Coalville. This limits the amount of knowledge of the North Slope's human population such as their age, ethnicity, occupations, spatial distribution, and even accurate numbers of the population over time. Newspaper accounts, a 1913 Forest Service report (Baker and Hauge 1913), oral history (King 1991), and other secondary resources (Colton 1966) provide the main historical data for this area. Commonly, workers within this industry were termed, "tie hacks", which was a pejorative term at the time used by farmers and ranchers, is not therefore used, replaced instead with "tie cutter".

While historical knowledge on this industry is limited, this raises the value of the archaeological dimensions of the North Slope's tie cutting industry. All the physical dimensions of historic properties in the area yield a unique story unrecoverable through other means common to the historian. Material culture, from the waste discarded by tie cutters, to their cabins, to the spatial distribution and layout of their camps provides an abundance of data for

[1] Unfortunately, historic and archaeological knowledge on the tie cutting industry is remarkably underdeveloped, particularly in Utah. Formal, peer-reviewed historical and archaeological research and publications on the Utah tie cutting industry includes only Colton (1966) and Ayres (1996).

this landscape. It is clear that the tie cutters of the North Slope, while itinerant and largely anonymous, significantly shaped local, regional, and national patterns of history through their supply of timber for the construction and maintenance of the transcontinental Union Pacific railroad and its subsidiaries. This is perhaps the most compelling reason for a National Register nomination for a region defined by its archaeological potential.

Geographical Considerations

Unlike other logging frontiers in the United States, the tie cutting landscape of Utah is geographically limited and bounded clearly by environmental and political factors. Most of the formal tie-cutting in Utah occurred only along a portion of the 120 mile length of the Uinta Mountains. The geographic area included in this multiple property submission is contained completely within the administrative boundaries of Summit County, Utah (Figure 1). Specifically, the area is bounded on the west by the West Fork of the Bear River, on the east by Henry's Fork River, on the south by the crest of the Uinta Mountains (also following the Summit/Duchesne County lines), and on the north by the Wyoming/Utah state border. There are properties associated with this context located within Wyoming, but are not included due to difficulties with administrative boundaries. Property types located within the geographic area focus largely on procurement, transportation, and minor processing activities, while properties in Wyoming focus more on the post-procurement treatment or usage of ties from the North Slope of the Uintas. Much of the area within this MPS is managed by the United States Forest Service (Figure 2).

Due to the mountain chain's high elevation and unique microclimate, the area receives significant amounts of moisture during the year. Interestingly, Whitlock and Bartlein (1993) and Munroe (2003) note that the western half of the mountain range experiences a summer-dry and winter-wet weather pattern, while the eastern half is completely opposite. Regardless, rain coupled with spring and early summer snowmelt provides a heavy flow for all the drainages flowing into Wyoming. This moisture-laden landscape provides ample opportunity for the growth of some of Utah's most significant timber reserves, with stands of lodgepole, ponderosa, spruce, and aspen. By far, however, lodgepole pine dominates the Uinta Mountains' vegetation regime, comprising the majority of the available timber. It is this abundant renewable resource, lodgepole pine, which first brought Euro-Americans to the North Slope in the years leading up to completion of the nation's first transcontinental railroad.

The tie cutting industry required the relatively easy flow of product out of the densely wooded North Slope and to the waiting rail lines at Evanston, Hilliard, Aspen, Piedmont, and Granger, Wyoming. Overland hauling of finished ties was an ineffective means of shipping product to market, with most communities over 30-40 miles from the cutting fields. This led to the effective use of many of the area's large waterways like Bear River, Black's Fork, Smith's Fork, Henry's Fork, and Mill, Steel, and Archie Creeks to float ties downstream during periods of heavy water flow. Tie cutters augmented these waterways with channel improvements, bank supports and buttressing, and through the creation of holding ponds constructed of wooden and earthen splash dams. Every spring the tie cutters would use seasonal high stream flows to float ties cut during the preceding winter to market in Wyoming. In addition, during the 1870s the Hilliard Flume and Lumber Company constructed a 30-mile long elevated flume, which allowed nearly year-round movement of products out of the Bear River drainage to market in Hilliard, Wyoming.

Log Procurement

This multiple property submission focuses on property types associated with the direct procurement, transportation, and processing of timber for use in the development and maintenance of the Union Pacific and Oregon Short Line railroads. From the early 19th century to the present wooden cross-ties dominate the technological adaptation for the construction of railroads throughout the world. While experiments attempted to determine if concrete, steel, or stone ties could be economically sustained for railroad construction efforts, wood continues to be the most economically viable and available material type. The history of logging on the North Slope of the Uinta Mountains began in the mid-19th century with establishment of Fort Bridger, on the Black's Fork River in modern-day Wyoming. It is unclear when the first sawmill and formal logging activity initiated, but by the mid-1850s there was at least one sawmill operating for the post, using logs acquired from the Uintas.

Log procurement in the North Slope was completed by use of axes from the 1840s to the 1930s, and potentially as late as the 1940s in some locales. Introduction of the one and two-man crosscut saws after the 1870s also influenced logging activity in the area. Only the introduction of chainsaws and diesel/gasoline-powered sawmills and trucks altered a century-old tradition of the broad-axe and saw wielding tie cutters. While the Hilliard Flume and Lumber Company and Coe & Carter Company employed steam sawmills in the 1870s, these facilities did not radically shift tie cutting behavior as seen by the introduction of the diesel/gasoline powered engines and trucks. The absence of available timber adjacent to the railroad grades in Wyoming and Utah, the North Slope's logging industry was always dominated by the supply of railroad cross-ties until the 1930s. Other logging activity did occur to supply sawmills in Evanston and Green River, Wyoming for processing into building materials, as well as supplying cordwood for charcoal kilns in Hilliard and Piedmont, Wyoming (Colton 1967:204-207). However, the bulk of the economic activity and employment in the North Slope was dedicated to the processing of lodgepole pine into cross-ties. Other regions within the United States supplied other, sometimes more sought after, tree species for railroad ties perhaps most importantly white pine. While lodgepole, and other softwoods, never supplied the majority of the product used in America's railroads overall, they did allow cost-effective construction and maintenance of railroad grades in the western frontier where transportation costs prohibited importation of higher-quality tie products from the eastern states. It is likely that the majority of the Union Pacific rail lines in Wyoming and Utah used lodgepole at rates higher than other railroads.

Tie cutting on the North Slope occurred on a seasonal cycle, with cutting and parking occurring in the winter months (Figure 3). Loggers would take ties directly to the stream banks, or a separate set of workers, termed "haulers", would take the finished ties from the cutting areas to creeks, streams, ponds or reservoirs. As logging occurred in the winter months, haulers would use horse-drawn sleds to move finished ties from the cutting areas to banking areas. Transport over snow allowed for more efficient and effective movement of product with the least amount of effort. George Loff, General Manager of the Standard Timber Company in Wyoming with operations on the North Slope, provides detail on this pattern in 1922:

> Because of the rough nature of the country in most of the Wyoming camps the bulk of the hauling is done with sleighs after the snow comes. Owing to this fact a maximum effort must be used to transport the ties from the timber to the creek bed while snow conditions are most favorable. As the snow gets deep the road breaking becomes increasingly difficult and in many cases operations are carried on in six feet of snow. Fortunately the snow packs hard in such cases and the horses do not break through very deeply. In the spring the warm sun softens the snow and the hauling is then confined to the early morning before the night freeze has been thawed out. In many instances ties are hauled on snow until well into June when the spring breakup comes and the drive starts. (Loff 1922:8).

According to Baker and Hauge (1913:26) an average hauler could load and transport 55-60 ties per trip on a horse-drawn sled into the cutting areas (Figure 4).

Over the entire history of tie cutting on the North Slope, some loggers and corporations would invest in the construction of splash dams to impound waters to form ponds. Ties would remain along the banks of these impoundments during the cold winter months. Once the surface of these waters thawed loggers would push the ties into the impoundment, and await the spring flows. During the spring and early summer thaw the splash dams would be breached, with the railroad ties floating down Mill Creek, Bear River, Black's Fork, or Smith's Fork to loading booms at Evanston and Granger, Wyoming (Loff 1922:12). Groups of tie cutters would then switch their attention from cutting to following the ties downstream and breaking up snags and ensuring that their products made it to market in Wyoming. In 1912-1913, Standard Timber Company constructed 1,500 feet of protective cribbing and one mile of channel cleaning and straightening along Mill Creek near Bear River to help direct ties downstream, as in the 1880s much of the product often breached the banks (Baker and Hauge 1913:33). Standard Timber Company also constructed possible cribbing on the West Fork and Middle Fork of Black's Fork. By the time the last ties arrived at market the seasons would be turning towards fall again and the tie cutters would move back to the high country to get ready for the upcoming winter season.

After floating the cross-ties to loading stations downstream on Bear or Green River, the Union Pacific subjected the ties to different types of treatment in hopes of prolonging their usefulness. Cross-ties used by the Union Pacific or Oregon Short Line coming from the Uinta Mountains were treated with preservatives at one of three plants in Laramie, Wyoming, Pocatello, Idaho, or Wyeth, Oregon (Railway Tie Association 1922:17). A treatment plant at Granger, Wyoming also infused these cross-ties with several different types of chemicals including zinc chloride, and the more well-known, creosote. Most railroad ties were not formally treated by any process before 1876, even though testing of zinc chloride and creosote in the United States dated to 1855 and 1868, respectively (Oaks 1999).

In the early days of tie cutting, loggers scoped out and secured their own locations for timber cutting, sometimes leading to conflicts with other loggers or corporations. By the early 1900s, the creation of the Standard Timber Company, and its domination of the local market, led to a more organized exploitation of timber resources. In this later phase loggers were assigned parcels of land that had been professionally assessed either by timber cruisers employed by the companies or the United States Forest Service (Baker and Hauge 1913:5-8). Standard Timber Company focused most of their logging efforts on lands owned by the UPRR where they could cut for free, before moving to royalty cutting on Forest Service property. Loggers then cut limited strip roads and began the process of harvesting lodgepole pine (Baker and Hauge 1913:11). Railroad ties were the most profitable timber product available for the loggers to harvest, bringing in 14 cents per tie in 1913, compared to only 3 1/2-10 cents for mine props or stopes (Baker and Hauge 1913:10).

Given the economics of tie production, the tie cutter focused on trees between 8 inches and 10 inches at Diameter at Breast Height (DBH), which would equate, hopefully, to two first-rate railroad ties per tree. This focus would maximize the effort of procurement and payoff per tree. Forest Service standards required that tie cutters working the 1920s and 1930s for Standard Timber Company used all felled trees within eight inches of its top (King 1991:66). While tie cutters focused on a specific type of tree (8-10 inches DBH), larger diameters (>10 inches) were taken potentially for logs or for cordwood. Loggers often felled trees below 8 inches DBH as part of clearing activities for roads, building platforms, equipment pads or felling areas. These smaller diameter trees could then also be utilized for firewood near camps or settlements. This was largely a sustainable harvest practice. For instance, discussion of cutting on Mill Creek noted that, "[i]t is expected that this area will be cut

over again in from thirty to fifty years, as the present mode of cutting removes but from forty to fifty trees per acre as a maximum and generally leaves about 300 or 400 trees of smaller size" (*Ogden Standard Examiner*, December 18, 1915:2).

Chronology

1843-1867

Euro-American logging of the North Slope of the Uintas began in 1843 with the establishment of Fort Bridger by famed mountain man and trapper, Jim Bridger and partner Louis Vasquez. Early reports of Fort Bridger, located on the Black's Fork River, noted that it was constructed with timbers procured from the Uinta Mountains (likely procured from within the boundaries of modern Wyoming). Members of the Church of Jesus Christ of Latter-day Saints acquired the Fort Bridger property in 1855, and used it to supply their immigrants heading to the newly formed Utah Territory. Members of the LDS Church torched the sawmill and other facilities at Fort Bridger before the advance of U.S. Army troops in 1857 (Bigler and Bagley 2011:55). Prior to the acquisition of the Fort Bridger property in 1855, the LDS Church established their own trading post, Fort Supply, a few miles upstream from Jim Bridger's establishment. Members of the LDS Church established Fort Supply to aid in the care and comfort of westward bound converts, and boasted over a hundred cabins, a gristmill, and a sawmill (Christensen 2004:252). This was perhaps the first sawmill in southern Wyoming, supplying milled lumber for construction activities. Fort Supply was also destroyed in the advance of Johnston's Army in 1857.

After conclusion of the Utah War of 1857-1858, the U.S. Army acquired the Fort Bridger area as a military reservation and began construction of a formal post. Judge W.A. Carter received the sutler contract with the U.S. Army after they secured Fort Bridger from the Church of Jesus Christ of Latter-day Saints. During the early 1860s, Carter established at least two large sawmill operations on the Smith's Fork of the Green River in the area now contained within the Wasatch National Forest administrative unit. The U.S. Army purchased all their milled lumber either from Carter's operations or imported it from Salt Lake City (Hoagland 2004:55). Attempts by Judge W.A. Carter to create the Fort Bridger and Uinta Mountain Railroad spur from the Union Pacific into the rich timber lands reached the U.S. Congress in the 1870s, but failed due to lack of capital and political support (Hayden 1872:54). Carter supported the establishment of the first formal freight and wagon road from Fort Bridger to Fort Duchesne in the Uintah Basin, crossing the Uinta Mountains near Flaming Gorge. The Carter Road, taking the name of its main proponent, was listed on the National Register of Historic Places in 2001 (NRIS #00000354).

Between the establishment of Fort Bridger to the arrival of the transcontinental railroad in the mid-1860s, logging occurring on the North Slope provided building materials or firewood for the small settlements along the richly-watered streams and rivers. No tie cutting occurred between 1843 and 1866, thus property types from this period should be judged for eligibility separately from this context. This initial logging activity would be a significant component of the area's history but outside the main tie cutting industry detailed here.

1867-1912

While the rich timber supplied the small community and military post at Fort Bridger, the advance of the railroad in the 1860s signaled a change in the economic scale of logging in the region. In order to supply the needs of the Union Pacific Railroad, which required, on average, 2,640 wooden cross ties per mile of track with an average of 350 replacement ties per mile per year (Olsen 1971:12), hundreds of workers entered the mountains of Wyoming, Colorado, and Utah. The only historical mention of Judge W.A. Carter's direct involvement in the tie cutting trade in 1868-1869 comes from Shurtleff (1979) who notes that Carter operated 50 tie cutters out of the head of

Black's Fork. In addition, they used a log flume, possibly a rollway or slide,, and floated the ties down the Black's Fork in the spring of 1869. This is not just the only mention of Carter's involvement in the tie cutting industry, but also the only notation of a log flume, or possible rollway, in Black's Fork from this period.

Levi Carter, unrelated to Judge Carter, was far more instrumental in the development of the tie cutting industry on the North Slope. Partners Levi Carter and General Isaac Coe received most of the initial contracts to supply wood products to the quickly sprawling Union Pacific Railroad in 1866. Coe and Carter sold ties to the Union Pacific for $1.00 to $1.30 while only paying between 35-60 cents to producers (Thybony 1985:60). The high profit margins during the initial construction phase of the Union Pacific Railroad between 1866 and 1869 helped to cement their position as a central player in the tie-cutting business in Wyoming, Utah, and Colorado. When the Union Pacific company created the subsidiary Rocky Mountain Coal Company in 1875 to develop the rich coal deposits along the railroad grades in Wyoming, the market greatly expanded for mine props and ties for narrow gauge rail (Thybony 1985:62). By the late 1860s and early 1870s, Coe and Carter established at least three sawmill operations on the North Slope of the Uinta Mountains: on Muddy Creek, Black's Fork, and one at the confluence of Steel Creek and Smith's Fork.

While Coe & Carter played a significant role in the logging development of the North Slope, perhaps one of the most impressive feats was accomplished by the Hilliard Flume and Lumber Company. Operating on the Bear River drainage, paralleling the modern Mirror Lake Highway from the headwaters in Utah to Evanston, Wyoming, the Hilliard Flume and Lumber Company constructed a 30-mile elevated flume with six additional miles of the Howe feeder flume between 1872 and 1875 (Figure 5). These flumes brought timber from the headwaters of the Bear River to the loading docks at the town of Hilliard, in Wyoming (Colton 1967:205-206).

Cross-ties represented a majority of the lumber products floated to market down the Hilliard Flume, but other products included cordwood for coal-making operations in Hilliard, Almy, and Piedmont, Wyoming. Alexander Toponce, one of the original capitalists of the Hilliard Flume, described "[w]e brought down railroad ties, fence posts, sawed lumber and ordinary firewood which we made into charcoal. We had a saw mill which we moved to different points along the flume" (Toponce 1923:190). An 1879 tourist's guide noted that the sawmill at the head of the Hilliard Flume, "has a capacity of 40,000 feet in 24 hours, with an engine of 40 horsepower" (Shearer 1879:107). In the late 1880s and early 1890s, new owners deconstructed most portions of the flume, with local ranchers removing additional lumber. Some remains are now listed on the National Register of Historic Places as the Howe Flume Historic District (NRIS #78002695) (Ayres 1978).

Tie cutting during the late 19th century was a complicated system of financial and legal arrangements. While Coe & Carter and Hilliard Flume and Lumber Company both operated direct tie-cutting efforts, they also employed several subcontractors to supply product. The Evanston Lumbering Company and Burris & Bennett represented two of the most active subcontractors (Ayres 1975a, 1975b); both operated timber cutting projects in the Bear River area of the North Slope of the Uintas. These subcontractors would sometimes supply Coe & Carter directly, who then in turn sold to the Union Pacific Railroad, or they would sell to the intermediary Hilliard Flume and Lumber Company who would float the material down to Wyoming and then sell ties and other products to Coe & Carter. This complicated relationship led to several legal fights in the 1870s in regards to compensation (Thomas et al. 1879:398-399).

While the U.S. government granted the Union Pacific 12,800 acres of public domain land, in a checker boarded pattern, per mile of built track to support the construction (Athearn 1971:32), timber cutters operated in the Uintas without much regard for private or public land boundaries. Throughout the 1870s and 1880s, Coe &

Carter faced legal challenges from their subcontractors for insufficient compensation, and from federal and state governments for timber poaching. The Department of Interior sued Coe & Carter for timber trespass in 1876, with the firm paying two and a half cents per tie for the number of estimated ties removed from forest lands held in public trust. In 1882, following the success of the 1876 suit, the Department of Interior requested Coe & Carter pay for an additional 800,000 ties cut from Wyoming public lands supplied to them by subcontractors. Over the next several years Coe & Carter faced continued legal challenges to their harvesting of timber from public trust lands, leading to the firm formally making land claims in Wyoming and Colorado (Brainard 1889:227-228).

Meanwhile, on the western and southern slopes of the Uinta Mountains, loggers cut ties for the Union Pacific and Denver & Rio Grande railroads along Weber and Provo Rivers. Samuel Stephen Jones of Provo supplied over 140,000 ties to the Denver & Rio Grande during the 1880s and early 1890s by floating the products from the Uintas all the way to Provo City. On the Weber River, the Johnson and Liddiard Company supplied railroad ties to the Union Pacific Railroad at the Wanship Siding during the 1880s. The largest tie drive on the Provo River occurred in 1886 or 1887, with over 350,000 ties floating down the Provo River (Carter 1996:10-11). There is little historical research into the tie cutting industry of the Provo and Weber River drainages of the Uinta Mountains, with work largely accomplished by different companies and workers than the North Slope, thus not directly included in this Multiple Property Submission. However, the overall history of the tie cutting industry, specifically the process of the work is relatable to the South Slope efforts on the Provo and Weber Rivers.

According to Thybony et al. (1985:63), the partnership of Coe & Carter ended in 1884. A reformation of the company under the name Coe & Coe continued to cut timber in Wyoming and likely Utah into the 1890s. Declining railroad construction and maintenance, coupled with the collapse of the national economy in the early 1890s led to the cancellation of Union Pacific's contracts for tie-cutting in 1895. Over the next several years, tie cutting apparently declined on the North Slope, although small operations likely continued on a limited basis on the Bear, Black's Fork and Smith's Fork Rivers.

1913-1950

With a resurgent Union Pacific Railroad increasing its track mileage and widening grades to accommodate more modern locomotives, the early 1900s witnessed a significant increase in demand for cross-ties including maintenance activity. As Olsen (1971:4) notes, the railroads required about one-fifth of United States' timber harvest, as "[t]he largest single use was for crossties, but they also used large amounts of bridge timber and piling and a variety of other timber products, in car construction and repair, maintenance of telegraph lines, snow fences, tunnels, wharves, buildings, and platforms." Brown (1919:263) notes that demand for ties increased from 64 million per annum in 1890 to upwards of 145 million by 1919.

The successful lawsuits against Coe & Carter's timber poaching activities in the 1870s illustrated a growing concern towards management and control of timber-lands in the 19th and early 20th century. Establishment of Federal Forest Reserves in the 1890s, and the formal institution of the United States Forest Service in 1905, signaled a change to the way timber companies extracted this renewable resource from the Uintas. Where once Coe & Carter and other contractors of the type could operate with little oversight, now federal agencies in charge of public land controlled the acreage, charged a fee, and even determined the types, quantities, and form of trees selected for timber harvest.

The North Slope of the Uinta Mountains, between the Bear and Green Rivers, was variably part of the Wasatch, Uinta and Ashley National Forests between 1905 and the 1920s. Most of the western portion of the North Slope was the Uinta National Forest from 1905 until 1914, while most of the eastern portion was the Ashley National

Forest or on the Fort Bridger Military Reservation. Timber cutting efforts on federal lands now fell under the authority of the United States Forest Service, which initiated significant restrictions in the amount and process of timber cutting as noted in this 1914 description of logging on the North Slope of the Uintas:

> There are very few regulations governing the chopper on the private lands, and the object is to reap the greatest possible benefit at the present time without regard to the future. In the government timber, however, the cut-over land must be left in a condition to secure growth in time to come. This is accomplished by marking all the trees to be cut (blazing the side of the tree with a hatchet and stamping it with a U.S. hammer) according to forestry principles. Only a short stump must be left, every tree utilized as far up in the tops as practicable, and the resulting brush lopped and piled for burning. This latter provision is necessary to reduce the fire danger and also to limit the liability of the spreading tree diseases. (*Ogden Standard Examiner*, March 21, 1914:10)

In addition to monitoring logging directly, the Forest Service also monitored the number of ties cut, stamping them with a "US" die hammer, so that the federal government would receive the correct amount of royalties for the timber cutting (King 1991:80-81).

In 1912, the Standard Timber Company, incorporated in Lincoln, Nebraska and in 1913, set up a base of operations for tie-cutting in Evanston, Wyoming. After this point Standard Timber Company dominated the logging industry of the North Slope well into the 1930s and even early 1940s. The owner of the newly formed company, D.M. Wilt, operated an earlier logging operation known for timber poaching in Colorado (Ayres 1996 179-180). Using his contacts from his earlier venture, Wilt and the Standard Timber Company signed a contract in 1912 to supply the Union Pacific Railroad with seven million ties within nine years (Baker and Hauge 1913:1).

Using significant amounts of capital, Wilt orchestrated formalized and highly planned arrangements of cutting areas, with central commissaries near main roads and waterways, a network of satellite camps established in the timber, and a regimented system of waterway development to allow for floating of ties on the drainages of Mill Creek, Black's Fork and Smith's Fork. In 1912-1913, Standard Timber Company's first development was a large, one and a half story log commissary with support structures (Figure 6), near the confluence of Mill and MacKenzie Creek, just east of Bear River (Baker and Hauge 1913:1, 40-41). From this central point, over 150 loggers ventured into the rich lodgepole stands, establishing camps and strip roads in seven sections of lands owned by the Union Pacific Railroad, granted to them in the 1860s (Baker and Hauge 1913:55). On these lands Standard Timber Company paid no royalties to the United States Forest Service, which allowed for higher profit margins while keeping the per unit cost of cross-ties down. As desired timber types declined on these private land parcels, Standard Timber acquired contracts to log on federal lands for a fee.

While logging operations continued near Mill Creek, Standard Timber Company established additional commissaries on the Black's Fork in 1916, and Steel Creek (near Smith's Fork) about 1920 or 1921 (*Ogden Standard Examiner*, March 21, 1914:10; *Salt Lake Telegram*, October 15, 1920:17; *Salt Lake Telegram*, July 19, 1921:2). By 1921, the Standard Timber Company cut approximately 47 to 81 million board feet of timber from the Mill Creek, Black's Fork, and Smith's Fork drainages. This timber cutting provided hundreds of jobs to seasonal and permanent workers, while also significantly increasing the revenues of the United States Forest Service. As with the rest of the nation, the Great Depression slowed timber cutting on the National Forests, with only one recorded large tie floating occurring on Smith's Fork in 1935 (*Salt Lake Telegram*, May 27, 1935:3).

There is little demographic data for the Tie Cutting Industry of the North Slope except for a simple tally in 1913 of those on the Mill Creek cutting area and then 1930 census records for a "Tie Hack Camp on Henry's Fork". By 1913, the ethnic composition of the tie cutting industry of the North Slope comprised:

> The choppers may be divided into two classes, the Scandinavians who are professional choppers, and Americans who are simply amateurs, ranchmen, railroad men, and sheep men trying to pick up a little money during the winter. (Baker and Hauge 1913:10)

Baker and Hauge (1913:3) tallied approximately 161 men employed by Standard Timber Company in the Mill Creek operation, with an additional 20 men employed on the Mill Creek bank improvements. Cutting work in nine areas employed the majority of these cutters averaging about 20-22 tie cutters and 3 haulers per section of land. Improvements to the Mill Creek drainage employed nine, while the supervisory force and other skilled laborers accounted for another eight at the commissary complex.

There is little mention in other historical documents of tie cutting occurring on Henry's Fork, but the enumerator carefully chose that name for the census sheets. From this 1930 record, researchers can glean a significant amount of demographic information. Of the 98 individuals enumerated at this location, there were 78 males and 20 females, of which, 24 were children. There were thirteen married couples, with three wives serving as camp cooks for the tie cutters. Perhaps even more significant information from these records is a glimpse at the ethnic composition of this tie cutting community (See Table 1). Of the 64 men working at this camp, 32 were of foreign birth with the remaining 32 from various points in the United States. Analysis of the foreign birthplace of the tie cutters, laborers, or woodsmen enumerated at the Henry's Fork Camp finds the majority were from Sweden (20), with lesser amounts from Finland (6), Norway (2), Germany (1), Ireland (1). French Canada (1), and English Canada (1). This limited census record provides the most complete demographic dataset for the tie cutting industry in Utah.

Until the introduction of gasoline powered chainsaws, automobiles, and sawmills, all tie cutting occurring on the North Slope was done by hand with axe, and saw after the 1880s. In the late 1930s, tie-cutting continued but employed the use of modern gasoline-powered machinery and vehicles to facilitate the operations. In 1938, a Forest Service newsletter highlighted that at Standard Timber Company's new camp near La Barge, Wyoming, six portable sawmills "are now active in sawing ties, in addition to 105 men hewing ties" signaling an end to the era where hand-hewing dominated the tie trade of Wyoming and Utah (USFS January 5, 1938:3).

Railroad companies viewed hand-hewn ties as a superior product to those processed in sawmills throughout the 19th and early 20th century, for both durability and cost efficiency. Olsen (1971:112) describes the advantages of a hand-hewn tie as "containing more wood", contained "irregularities meant that for a stated size and price it was always oversize" and presumably "added strength to the track". Olsen continues that railroad companies discovered that ties produced by sawmill, "were uniform and were smaller on the average" and "they weighed less and saved freight". As portable sawmills became practical, the proportion of ties processed through a mill rose nationwide from 15% in 1909 to 25% in 1915 (Olson 1971:113). On the North Slope, however, sawmills did not alter the industry significantly until the late 1930s.

Hand-hewing, and the other traditional patterns of tie cutting on the North Slope, largely came to an end when the Standard Timber Company announced an end to winter logging in 1939. Standard Timber Company Manager, Malcolm McCuaig ended the traditional seasonal round of tie cutting in 1939, "[o]wing to a new sawing method of finishing ties making them hard to handle in winter snows, Standard Timber company will hereafter confine cutting logs to the summer season" (*Ogden Standard Examiner*, October 1, 1939:3). New Forest Service regulation in 1939, requiring all trees to be cut to within 12" of the ground surface, also pushed Standard Timber to curtail winter logging.

Use of automobiles permitted logging during the summer, which also significantly altered the seasonal pattern of

logging in the region. In his autobiography, Isaac E. Smith (1979:47-48) noted that the new timber sales on Smith's Fork in the late 1930s and early 1940s, "was well opened up with roads built by the Forest Service and strip roads left by the tie hacks," which facilitated the use of trucks and "[o]ur 1 ½ ton trucks were driven along the strip roads and loaded by hand," replacing the horse-driven sleds of the previous eras. Truck-logging also precluded the necessity of a large labor force distributed in isolated camps throughout the woods, with construction of a bunkhouse or other residences at a centralized sawmill completed if necesary . However, adoption of these new techniques led to problems with dealing with snow, including curtailing of logging operations during heavy snow periods as in 1948 (*Salt Lake Telegram* December 7, 1948:28).

Logging continued on a large-scale through the 1980s and early 1990s on the North Slope, utilizing modern techniques of truck-logging. In addition, instead of selectively cutting certain sized trees, most of the techniques after the 1950s focused on clear-cutting techniques for use in large sawmills and pulp mills. This was a radical departure from the earlier selective logging techniques of the tie-cutting era. Aerial photographs today illustrate the lasting legacy of the late 20th century clear-cuts on the North Slope, but provide yet another anthropogenic event that helped to shape the landscape.

Conclusion

The tie cutting history, while seemingly contiguous in activity from the 1860s to the 1930s, reveals marked variation in the means and mode of production over this period. Early tie cutters generally had more control of their own labor and sold their products to a company, but many were indeed employees. Later, tie cutters worked for a large corporation, leading to a loss of control to the means of production, and also creating a type of dependent relationship to the company for food and equipment during the cutting season. Significant changes in ethnic composition of the tie cutting industry on the North Slope occurred, from a largely Anglo-Irish composition in the 1860s-1900s, to the introduction of Northern European-born or descendant loggers from Sweden, Norway and Finland after 1912. There is of course exceptions to these patterns within each time period, and should be used as general explanatory framework that could guide archaeological and historical investigations. Introduction of gasoline or diesel-powered chainsaws, steam and diesel powered sawmills, and gasoline trucks during the late 1930s radically changed the nature of the tie cutting lifestyle. Instead of spending the majority of their year in the woods, tie cutters could now live more comfortably in more permanent centralized settlements and make the short commute to the cutting fields. Introduction of trucks altered the seasonal cycle from cutting in fall and winter and floating in spring, to cutting all summer and hauling out before and after winter. More importantly, tie cutters likely took different jobs in the winter During the 1940s the life of the tie cutter disappeared completely from the cultural and historical landscape of the North Slope, leaving behind only its abandoned remains and byproducts.

Section F: Property Types

As detailed in Section H, there is a sizable amount of pre-existing site documentation and historical information to draw out patterns in property types. Since the 1970s, federally mandated cultural resource inventories have located approximately 230 archaeological and historic sites (Table 2) on the North Slope of the Uinta Mountains that are associated directly with the tie cutting industry (1867-1940s). Archaeologist James E. Ayres documented another 150 sites in his inventory, with possibly 100 of these not included on this list. Collation of the documentation is still needed. By the late 1930s, it is somewhat difficult to tease out the differences between railroad crosstie and other types of logging activity (lumber for example) due to the use of portable sawmills. Regardless, these property types are associated with the generalized logging history of the North Slope, and only through detailed historical and archaeological research can the true association be determined.

The Multiple Property Documentation Submission for Commercial Logging in Minnesota (1837-1940s) completed by Birk (1998) outlines a useful breakdown of property types in a historic logging landscape. While Birk (1998) outlined the development of all commercial logging activity and property types in Minnesota, the generalized pattern of log procurement and transportation applies to the tie cutting industry on the North Slope of the Uintas. Focusing on a single type of logging activity, however, required a more fine-grained separation of property types. Birk (1998) noted that it is sometimes difficult to associate logging to the archaeological remains of properties to a specific function without more detailed analysis. This is of course always an issue dealing with the limited amount of documentary and archaeological materials left at logging-related properties. An inability to historically determine the function, or in some cases even temporal period of a site, is an opportunity for research questions through combining historic and archaeological material and analyzing for relevant patterns.

Similar to Birk (1998), keeping property types sufficiently broad at the upper tier creates flexibility during inventory phase identifications of new properties by not requiring formal designation of site function (Table 3). Property types include Procurement, Domestic, Transportation, Processing, Oversight & Management, and Isolated Finds. For example, the property type of Domestic ranges from solitary cabins far from major thoroughfares, multi-cabin camps, and the centralized and sprawling commissaries. Distinctions between camps and commissaries is not difficult, and keeping function at a high level provides a framework for creating models to test function in the overall logging system through historical and archaeological materials. Following the guidance of National Register Bulletin 16, each of the property types below include discussion of the potentially relevant property categories including buildings, structures, objects, site, and district as defined (NRHP 1995:4-6).

Procurement
Procurement properties include the byproducts of activities including stump fields, waste piles, slash, and abandoned product. These properties are directly associated with the physical action of cutting trees and the hand-hewing of logs into finished, but untreated, railroad cross-ties, poles, mine props, and cordwood. As most logging on the North Slope occurred in the winter, many of the remnant stumps are 3'-5' in height, but some are much shorter perhaps indicating seasonality of logging activity outside the norm. Waste piles can be formed by the de-barking or forming of ties by axe and peeler but are likely difficult to locate given their organic composition. Slash is largely the byproduct of logging activity, not a reflection on the production of finished railroad ties, and is the result of clearing vegetation from roads or other areas. Finally, abandoned finished products are generally found nearest the point of procurement, and might have been forgotten or missed by haulers, or perhaps did not meet the established quality standards for railroad ties and were subsequently ignored. There are currently only four documented sites relating to procurement on the North Slope, with two being tie

loading decks, and another two comprised of abandoned ties. This low number is only the result of variable recording standards and the ignoring of these property types by past archaeologists. Ayres notes the presence of at least another six to seven sites relating to abandoned cordwood, ties, or saw logs that require further documentation.

Procurement sites might contain additional property types that exist within, or extend through, their boundaries. Roads that connect the areas to the more centralized distribution areas could extend into and through these areas. Isolated finds, such as abandoned tools, alcohol containers, or lost personal items indicate the presence of the historic tie cutter within the procurement zone. In terms of NRHP evaluations these properties could include sites, objects and districts, not structures or buildings.

As procurement property types are generally the organic remains of past logging activity, there is a high level of natural degradation through decomposition, collapse, fire, or other environmental factors. In addition, procurement properties are likely the hardest for managers to define boundaries as stump fields could extend for hundreds, if not, thousands of contiguous acres. These property types can help historians and archaeologists understand the practice of tie cutting, procurement strategies, culturally-based determinations of high-quality timber stands, and also as a proxy for past environmental conditions. Paullin (2007) even demonstrated how boring stumps for tree-ring dating could help define boundaries for historic and archaeological sites with limited ground visibility.

Domestic

Domestic properties includes all areas where there is evidence of overnight or longer occupation by humans associated with historic tie cutting activity, and includes tent platforms, lone cabins, multi-cabin sites, commissaries, cemeteries, trash scatters, and trash dumps. In terms of NRHP evaluations these properties might include buildings, sites, structures, objects, and districts. This property type extends from itinerant tent camps where no permanent building ever formally existed to the formally organized multi-structure commissary camps containing several building types and functions. Types of buildings common in the area are habitation, blacksmith, communal housing (bunkhouse), communal eating (cookhouse), livestock barns, outhouses, and storage. Out of the current database of known sites on the North Slope there are 169 properties that fall into this category, including 162 cabin sites (ranging from one to nine structures). There are also three known Standard Timber Company Commissary camps on the North Slope and are the Mill Creek (42SM70), Steel Creek (42SM21) and Black's Fork Commissary (42SM23). Only the Black's Fork Commissary is located on private land, while the rest of these properties are managed by the Uinta-Wasatch-Cache National Forest. In addition, there is one known cemetery at Suicide Park (42SM118; Figure 7), and three isolated domestic trash dumps relating to the historic tie cutting period. While cemeteries are typically only eligible for nominating to the NRHP under Criteria Consideration D, by 1992 there were over 1,700 listed which reflects the significance of these sites to local populations (Potter and Bolland 1992:1). As of 2013, the National Register online database only notes the presence of approximately 1400 of these types of resources currently listed.

Instead of trying to separate out all the specific functions of this variety of site types, a broad domestic category encapsulates the areas where tie cutters lived during the logging experience. These sites comprise the bulk of material culture that can be used to investigate past human activity on the North Slope through domestic refuse. Artifacts at these sites can provide information on historic lifeways, dietary habits, trade networks, ethnicity, gender, wage laboring landscapes, recreation, religion, children, and a host of other important archaeological and anthropological questions.

Similar to procurement sites, most domestic properties on the North Slope were created from locally available organic materials such as logs and milled lumber. Organic remains do not have high levels of preservation without formal maintenance, which did not occur post-abandonment. Thus, preservation of earlier sites is more limited, and can be affected by local site conditions such as water and exposure to wildland fire, and even vandalism. Properties dating to the 1860s-1870s are relatively rare given the organic preservation rates on the North Slope.

Transportation

Transportation properties include all variations of log movement activities and features, both by land and water. These include strip roads, haul roads, dams, reservoirs, diversion channels, flumes, cribs and pilings, tie sleds, trucks, and log/tie jams that were directly associated to tie cutting activities. In addition, if there is a barn feature with no other associated domestic remains it could possibly be associated with this category. In terms of NRHP evaluations, transportation properties could be structures, sites, objects, districts, and possibly individual buildings, though quite rare. Unlike other logging frontiers, the North Slope tie cutting industry does not include railroads or more formal water-driving features that are seen in the Midwest or Northwest United States.

Currently, there are 22 properties identified on the North Slope that relate to this property type, and include 10 roads, five splash dams, two bank improvements for floating of ties, two dams, and single examples of a float camp, bridge, and a loading deck. Tie cutters did impound water using splash dams with five examples currently recorded, including an extant structure (42SM71) adjacent to the Mill Creek Commissary that likely pre-dates that installation (Figure 8). Standard Timber Company spent $3,500 in 1912-1913 to improve the course of Mill Creek by installing willow and aspen framing and irrigation ditch diverters for the annual spring tie float (Baker and Hauge 1913:4). The Howe Feeder Flume, part of the Hilliard Flume that brought ties and other wood products from the Upper Reaches of the Bear River drainage in Utah to market in Hilliard Wyoming, is listed on the National Register as an historic district (Ayres 1978). Currently only the Howe Feeder Flume and associated cabins are listed, but other segments of the Hilliard Flume exist and could be eligible for the National Register.

The most important feature of the logging landscape was the construction of road systems, both major and minor, to move timber resources to market and supply the loggers (Figure 9). Unlike mining landscapes with a limited number of roads focused on a spatially restricted resource extraction zones, loggers create a braided and elaborate systems of roads for haulage, stripping, and general transportation. These roads possess various levels of visibility on the current landscape, owing to factors including construction style, overgrowth, and modern usage.

An apt analogy for the road system of the logging landscape of the North Slope, is that of a tree. The main transportation routes serve as the trunk bringing needed supplies into and out of the logging region. Haulage roads idealized as branches distributing these supplies into the furthermost reaches of the logging landscape, and also bringing products back to the trunk. Finally, at the furthest extent of this tree, the strip roads reflect leaves, whereas they do most of the gathering, whether through photosynthesis or logging activity. The North Slope's logging operation mirrored others around the United States, as this description from the Upper Peninsula of Michigan, with several main roads, "[t]hrough the heart of every logging operation…about twenty yards wide," with smaller secondary roads, "much narrower about eight to ten feet wide" (Karapinski 1989:68). It appears that the main roads of the North Slope measured significantly less in width than many of the Midwestern roads, owing to the focus on railroad ties versus whole logs. All components of this system are dependent upon each other, and failure of one part of the system affects all others. For example, in 1920, heavy snow forced the close of both transportation and haulage roads on the North Slope, but tie cutters continued to log until supplies ran so short that relief parties on snowshoes were dispatched (*Salt Lake Telegram*, April 23, 1920:25).

Processing

Processing properties relate solely to use of sawmills and portable sawmills to cut logs into finished products, primarily cross-ties. Associated site types with processing properties include the byproducts of this processing such as sawdust piles and milled slab waste. In terms of NRHP evaluations, processing properties could be buildings, structures, sites, objects, and districts. Coe and Carter established at least one sawmill on the North Slope of the Uinta Mountains during the 1860s and 1870s, located now on private land along Muddy Creek, near Mill Creek. Neither of these properties has been formally recorded at this time. During the 1930s, use of gasoline and diesel-powered machinery allowed the introduction of both permanent and portable sawmills that assisted the production of railroad ties. Throughout the last half of the 1800s and into the 1920s the railroad industry continued to prefer hand-hewn ties over sawmill varieties for two main reasons, 1) more product for the cost, as hand-hewing usually resulted in larger ties than requested, and 2) a perceived structural strength through the marks and compression of exterior fibers left by hand-hewing versus the clean surfaces of a sawmill.

Currently, there are 19 identified sites that fall into processing properties with all but one associated with portable sawmills of the late 1930s and 1940s. As mentioned above, there are two other sawmills sites identified through historic research that require documentation. Processing sites can provide researchers with information on the technologies and techniques employed at any point in the timber history of the North Slope, and how natural sources of energy (water) or fossil-fuels were used in the process. Patterning of these processing sites can also provide some information on the efficiency and maximum yield of forest stands at time of harvest.

Oversight and Management

Oversight and management properties relate to a period after introduction of federal control over the exploitation of timber resources on the North Slope of the Uintas. First through creation of the federal forest reserves in the 1890s, and then after official formation of the United States Forest Service in 1905, timber harvesting by individuals and corporations was regulated to maximize the yield and create sustainable production. The North Slope was variably part of the Ashley and Uinta National Forests between 1905 and the 1920s, before formal designation as part of the Wasatch National Forest. To accomplish the goal of efficiently managing timber cutters, the Forest Service established guard stations along the length of the North Slope generally near commissaries. These sites were then connected by a telegraph and telephone line. In terms of NRHP evaluations properties of this type include buildings, structures, sites, objects, and districts.

As of 2012, there are seven identified sites on the North Slope that related to this property type. Three are Forest Service guard stations, where federal personnel would stay while monitoring activities, and include the Mill Creek (42SM111), Hewinta (Figure 10), and Whitney Guard Stations. Another three sites relate to an east/west running Forest Service telephone line that connected all guard stations together. Finally, a guard station and tie scaler's cabin (42SM320) along the West Fork Black's Fork was identified by archaeologists and still contains a door bearing the Forest Service insignia though the cabin is in disrepair.

These sites relate the history of federal management of timber harvesting, and signals a change of the nationwide logging and tie cutting industry. Before arrival of the Forest Service and Forest Reserves, timber poaching (illegal harvest of timber off federal trust lands) was rampant in the West. D.M. Wilt, owner of Standard Timber Company, actually was sued for timber poaching in Colorado before starting the company in Evanston, Wyoming.

Isolated Finds

Isolated Finds are solely objects that fall beneath the guidelines of what constitutes a site in the State of Utah. Currently, Utah guidelines are tiered off the BLM Statewide Cultural Resource Guidelines where a site is defined as 10 artifacts within 10 meters, 15 artifacts of two types within 10 meters, one or more features in temporal association with artifacts, or two temporally associated features (BLM Guidelines 2001:6). Thus, for NRHP evaluation purposes the property type could include largely objects, but could be undated structures without temporal association. Features could include an undated log loading deck, earthen berm, a single tie or abandoned log platform, or other single feature with no temporally associated artifacts. Artifacts could include isolated alcohol containers, abandoned or forgotten tools, sleds, horse tack, personal effects, or other material culture that represents a single human action (discard, abandonment, or loss).

Isolated finds are generally located directly where the human actor lost or abandoned an item, and can may significant information on where certain activity was occurring, the period of such activity (such as dating a stump field to a certain temporal period), who was conducting that activity (gender, ethnicity, socio-economics), or other as-of-yet undetermined research questions regarding alcohol consumption while on-the-job. Currently, there is no tracking mechanism for isolated finds in the State of Utah, and oftentimes these items are lost to paperwork. Creation of a database documenting the location and identification of such finds by the Uinta-Wasatch-Cache National Forest is currently underway.

Registration Requirements

In order to be eligible for the NRHP, properties must possess both significance and integrity as defined in National Register Bulletin 15 (1991). As described earlier, each of the six property types associated with the procurement, transport, and processing of wood for railroad ties and other wood products can be variably assessed for eligibility to the four criteria. Table 4 summarizes each property type, property categories, and the NRHP eligibility criteria that could be applied to each. Following NRHP guidance, properties on the North Slope could be eligible under Criteria A, for association with the historic tie cutting context as described in this document, Criteria B for association with significant individuals (though unlikely for these properties), Criteria C for distinctive characteristics of type or style, or perhaps under spatial layout, or Criteria D for the data potential from the historical and archaeological analysis of material culture. According to NR Bulletin 15 (1991:44), to be eligible for inclusion in the NRHP, "[t]o retain historic integrity a property will always possess several, and usually most, of the aspects of integrity standards," under the seven aspects Location, Design, Setting, Materials, Workmanship, Feeling, and Association.

Significance Criteria

Criterion A
Tie cutting related properties may qualify for local, state, regional, national significance under Criterion A for contributing to the broad patterns of history as outlined in this document. In addition, any future Multiple Property Submission contexts that describe and interpret the transcontinental railroad experience would also apply to these property types. Production of cross-ties from the North Slope of the Uintas allowed and promoted not only the expansion and cost-effective maintenance of railroad grades for hundreds of miles, and was part of a massive national economic and commercial venture, but also led to the first long-term historic human occupation of the area. Railroad expansion into the rural American West created new communities, strengthened the economic viability of some preexisting communities, and sometimes led to the near and complete abandonment

of others. Arrival of the railroads also markedly altered the nature of trade and consumption activity in the American West, by allowing the easy flow of mass-produced goods into markets generally left upon the fringes of the economic system, while promoting the movement of goods out of the region. In addition, communities formed downstream to provide distribution nodes for these finished ties, with the logging industry directly affecting these settlements' economy. While all of these communities fall outside the boundaries of this nomination, one example currently listed on the National Register of Historic Places, the Piedmont Charcoal Kilns of Uinta County, Wyoming (Barnhart 1971). These kilns turned the timber procured on the North Slope into charcoal used for mining smelters in Colorado and Utah.

These properties may also qualify for local, national, or statewide significance under Criterion A for association with historical events or trends. As described by Rohe (1986), there was a pattern of ethnic succession in the Upper Midwest during the early to mid-19th century. During the initial historic logging in the Midwest, most of the loggers were generally Anglo-Irish in background, with logging being a secondary occupation to homesteading, ranching, farming, or other ventures. A new wave of logging immigrants arrived in the mid-19th century, largely from a Scandinavian background, including those from Sweden and Norway, but also Finland. These individuals brought a sense of industry and professionalism to logging activities in the Midwest, and altered the historical, social, and cultural fabric of the region. Rohe (1986) also notes the influence of capital and formal corporate organization of logging activity in the Midwest. The North Slope of the Uintas almost perfectly followed this broad trend identified in the American Midwest, as noted in the preceding historical context section of this document. Non-professional Euro-American loggers provided the first s of ties for the railroad, of which most were replaced within a year due to their poor quality. Arrival of Scandinavian loggers in the late 19th, and more significantly in the first part of the 20th century, brought this sense of professionalism to the industry. This is a broad trend of national history that is worth exploring on the North Slope, and providing a comparative historical and archaeological signature to the scholarship of this topic in the Midwest.

For cemeteries or burial places, such as Suicide Park Graves (42SM118), the National Register notes that that these places can be determined eligible under Criterion A (and Criteria Consideration D) providing "the events or trends with which the burial place is associated must be clearly important, and the connection between the burial place and its associated context must be unmistakable" (Potter and Boland 1992:9). A cemetery or isolated graves associated with the North Slope Tie Cutting Industry is unmistakably linked to the overall context and should be judged appropriately.

Criterion B

Few, if any, tie cutting properties will be eligible for the NRHP under Criterion B, or their association with a significant person even on the local level. Currently there are only a handful of individuals deemed significant to the North Slope industry, including D.M. Wilt, owner and manager of the Standard Timber Company, and the principal owners of the Hilliard Flume Company, William K. Sloan, Fred H. Myers, John W. Kerr, and W.H. Wadsworth. Sloan and Kerr possessed direct ties to the industry, while the others supplied capital from afar. Active in local politics and community, Sloan served as a Uinta County Commissioner in the 1870s (Ayres 1978). While D.M. Wilt was a significant person in the local and regional area, there will be few properties that are directly associated with him, as he spent most of his time at the corporate offices in Evanston, Wyoming, or his other tie-cutting operations in the Wind River or Bighorn Mountains.

Criterion C

Only a small proportion of tie cutting properties will be eligible for the NRHP under Criterion C, as embodying distinctive characteristics of a type, period, or construction. It is claimed here, however, that the tie cutting

industry as a whole left a unique and vernacular signature to the built environment of the North Slope that does qualify analysis for distinction of a type, period or method of construction. As noted in NR Bulletin 15, "a structure is eligible as a specimen of its type or period of construction if it is an important example of building practices of a particular time in history" (NRHP 1991:17). North Slope tie cutters constructed common and unique architecture that varied over both time and space, and were influenced in the chosen style by socio-economics, permanency, ethnicity, and a host of other factors. Structures and buildings possessing enough integrity should be evaluated under Criterion C using these concerns. However, no sites on the North Slope could be considered as works of a master, possessing high artistic values, or representing a significant and distinguishable entity.

For instance, the Doggy Door Cabin (42SM604), likely constructed in the 1930s, retains significant integrity of its architecture and possesses several interesting facets of construction (Figure 11). As indicated by its name, this site possesses the only known example of an architectural element allowing the passage of a pet into, and out of, the building. A half-round log covered porch is a unique component of this architectural style. While most cabins are now ruined, Steel Creek Commissary (42SM21) possesses the best preserved example of full dovetail log corner notching style, in combination with fully faced interior and exterior logs (Figure 12).

Finally, the architecture on the North Slope, whether well-preserved or mostly ruined can provide significant information on the construction styles and methods used by the historic tie cutters. This is a direct linkage between Criterion C and D, and warrants further exploration. Relevant architecturally-based research questions answered by the standing structures could include the effect of ethnicity and socio-economics on building styles. Without a full accounting of the site types on the North Slope, sites with significant architectural integrity should be evaluated under this criterion.

Criterion D

Most tie cutting properties should be judged for eligibility to the NRHP under Criterion D, for potential to provide data for patterns of local and national history. Specifically, domestic and processing sites would be the most common properties eligible under Criterion D, due to the presence of surface and subsurface archaeological deposits. Archaeological remains, which include some discussion of the spatial organization and distribution of camps and architecture, can provide significant information about the lives of tie cutters, their relationship to the local environment and their connections to the outside world. As noted earlier, the lack of substantial historical documentation of the tie cutting industry on the North Slope leads to a determination that the archaeological material at these sites is of extra significance. Whereas census records, diaries, newspaper accounts and oral histories can provide a personal glimpse into a person's life, the near absence of these materials for the North Slope tie cutting industry gives primacy to material culture.

Archaeological information, even where excellent historical source material exists, provides a unique and unbiased perspective on past human cultures. Investigation and analysis of these physical remains can yield significant data on a variety of research domains. As discussed by Hardesty and Little (2000:64-65), there are five major research objectives that can frame the types of questions asked by archaeologists, historians, or other researchers, but only the four broadest are discussed here:

1. Preservation and Site Interpretation: Research projects and questions attempt to recover information for the needs of cultural resource management and public interpretation. These types of projects generally focus on the location and delineation of features, and determining their historic appearance. For tie cutting industry sites, research questions could focus on understanding the original design and

layout of the Mill Creek Commissary for potential re-construction of these past features and to guide interpretive trails and panels.

2. Historical Supplementation: Archaeology can provide simply more information on past historic events by comparing and contrasting with the documentary record. Historical supplementation through archaeology can support or negate past interpretations or accounts. Whereas much of the North Slope tie cutting industry exists outside the pages of primary or secondary resources, a simple reconstruction of past events supplements this facet of history. For instance, there is limited information on where and when logging occurred on the North Slope before the arrival of the Standard Timber Company, specifically during the first historic period. Archaeological material can reconstruct this past land use pattern both spatially and temporally.
3. Historical Ethnography: Research questions within this objective tend to attempt reconstruction of the totality of the historic lifeways of the group(s) under investigation. These questions attempt to create a historical ethnography, in the same manner in which a cultural anthropologists attempts to document the lifeways of living people. These questions could include reconstruction of past diets, worldviews, socio-economics and hierarchy, religion, and a multitude of other cultural constructs that constitute the past group. Specifically to the North Slope, there is perhaps less documentary record on this population and industry than most other historic themes in Utah given the area's geographic remoteness, the itinerancy of its practitioners, and the lack of primary records from Coe & Carter, Standard Timber Company, and similar companies in the Uinta Mountains. Archaeology sometimes will provide the only means of reconstructing this historic population.
4. Testing Ground for Archaeological Principles: This research objective attempt to refine, refute, or support analytical frameworks within the field of anthropological archaeology. This could include testing of and within theoretical paradigms defined by the anthropological and archaeological discipline or more specific concepts such as middle-range theory or optimal foraging. For instance, human behavior patterns tested within sites on the North Slope in regards to human adaptation to environment could be applied to broader and temporally deeper contexts such as prehistory.

Compared to other historical archaeology site types in the United States, the investigation and analysis of logging landscapes is far from developed. Mining, homesteading, plantations, colonialism, and even railroading have received far more attention to social, historical, and archaeological investigation than logging. Franzen (1992:94) notes that "…archaeological remains of logging camps are an important source of information on one of the most significant processes in North American history: cultural change and adaption in relation to industrial work." Furthermore, Rohe's (1996) summary of the material culture of Great Lakes logging camp highlights four potential research domains that data from the tie cutting industry could inform, architecture and layout, foodways, logging tools and technology, and personal items. Each of these research domains includes a broad variety of theoretical and historical avenues for further investigation and touch upon all five objectives discussed by Hardesty and Little (2000:64-65), with a full discussion not necessary in this document.

First, some overarching problem areas touch upon the investigation of Rohe's (1996) four potential research domains. Ethnicity, socio-economics, gender, labor relations, and a host of other problem areas can draw conclusions from and inform interpretation of the four potential research domains. The unique nature of the tie cutting industry, coupled with the dynamic interplay between the human and environment highlighted in a logging landscape provides a unique testing ground for research programs that will help us not only better understand the tie cutters and associated workers but also inform broader research into human behavior through both time and space.

Some significant threads of inquiry can be discussed in relation to the North Slope Tie Cutting industry. Under an umbrella of architecture and layout, there has been no formal investigation on the arrangement of tie cutting encampments, or their spatial organization both over time (in the established periods), or intrasite layout, amongst sites within a drainage, or as part of the whole network of the North Slope system. Architecturally, a pertinent research question is whether the log cabin construction techniques evidenced within the research area includes if and how form, corner-notching style, internal arrangements of space, and associated material culture could help highlight the influences of differing ethnicity. For instance, King (1991) notes that some of the tie cutter camps on the North Slope included outbuildings that served as saunas for the Scandinavian loggers, providing direct evidence of an ethnic affiliation. This leads effectively into analysis of other material culture patterns that could help to better understand the formation and maintenance of ethnic and personal identity within a wage-earner frontier as described by (Schwantes 1987). There is a small field of inquiry attempting to understand the influences of the Finnish and Germanic traditions of log cabin construction in the United States (Jordan 1985; Kniffen 1965; Kniffen and Glassie 1966; Lay 1982; Lanier and Herman 1997; Carter 1984) and could be addressed through the architectural remains of the North Slope.

Within a research domain of foodways, which is perhaps the most expansive of Rohe's (1996) framework, the range of questions can include, 1) the nature of trade (business to consumer) relationships to these rural logging communities through the flow of manufactured goods into, and raw material out of, the North Slope from a core-periphery model, 2) ethnic and socio-economic influences on the types and foods prepared and consumed by the tie cutters and others within the system such as managers, blacksmiths and haulers, 3) effects of Victorianism on the formality of dining, 4) role of gender on influencing material culture, 5) evidence for self-treatment of maladies common to the hardscrabble life of a logger, 6) and perhaps a nuanced discussion of the intersection of foodways and personal leisure and recreation. The significance of food to the labor force is a well-known part of the logging culture throughout the United States. As noted by Conlin (1979:165), while many other workers throughout the United States fought for better living and working conditions, loggers uniformly were better fed than any other occupational group, as food was "an intrinsic part of the operation". In addition, research into logger and logging foodways should always stress, "the cultural context of foodways at lumber camps and the nature of the system within which they functioned" (Franzen 1992:75).

Domestic refuse is the most common component of all properties identified on the North Slope, with some sites containing thousands of artifacts associated with a specific period. Franzen (1996:346), firmly underscores the importance of the archaeology of logging camps as, "[t]he material remains of this exciting era can add much to the sometimes dim or distorted image of our lumber industry heritage." Work by Merritt et al. (2011) on processing pre-existing archaeological collections from the Mill Creek Commissary (42SM70), Steel Creek Commissary (42SM21), and McKenzie Creek Camp (42SM174), illustrates the research potential of these sites. While none of these collections were created by formal archaeological research design and testing, these materials suggest some larger patterns on trade and socioeconomics. For instance, most of the maker's marks on beer bottles relate to William Franzen & Sons of Milwaukee, Wisconsin, which was largely a Midwest bottler associated with Schlitz and other local brewers (Ayres et al. 1980:18). This is a differing pattern of material culture than other sites in Utah, where there was more variety in the types of bottlers represented. Standard Timber Company, and its corporately owned commissaries, supplied the tie cutters with only goods that they purchased and provided in their stores. Standard Timber, in addition, did not sell, provide, or encourage the consumption of alcohol. This limited the consumer choice of the tie cutters, and likely led to instances of resistance and subversion of control as a social impact of this strict, and overpriced, consumer system. Commissaries served a similar function as a company town in coal mining settlements elsewhere, with a strong paternalistic force that leads to tie cutters being beholden to Standard Timber, versus those working for their own

labor.

Aspects of Integrity

For a property to possess integrity it must be able to convey the selected criteria of significance through most, if not all of the seven aspects: location, design, setting, materials, workmanship, feeling, and association. All properties assessed through this context must be evaluated to determine if they possess sufficient integrity in order to be listed as part of the North Slope Tie Cutting Industry multiple property submission. Hardesty and Little (2000:45-47) provide some additional insight on the specific integrity considerations for properties by eligibility criteria. For Criteria A and B, integrity considerations of location, design, materials, and association are primary, with workmanship, setting, and feeling also judged but at a second tier of importance. Properties eligible under Criterion C should definitely possess integrity under workmanship, materials, and design. Hardesty and Little (2000:45) define that properties determined eligible under Criterion D should be able to convey or contain significant information to answer pertinent research questions.

Location: According to NR Bulletin 15, location is defined as, "the place where the historic property was constructed or the place where the historic event occurred" (1991:44). As noted by Birk (1998:14), location of a property within the North Slope could provide a firm indicator for the chronological period for its association, even in lieu of firm diagnostic cultural material. Generally, any property removed from its original location is not eligible to the NRHP, unless that building/structure was moved over 50 years ago. There are few properties on the North Slope that would have been subjected to moving during the historical period, given the lack of railroad-style operations, though Ayres notes at least several examples. Two 1910s-1920s cabins, one located at the Bear River Guard Station and the other at the Mountain View Ranger District in Mountain View, Wyoming, were moved to these locations in the 1980s as part of a mitigation effort. Both underwent significant rehabilitation post-move, and are not likely eligible for the NRHP.

Design: According to NR Bulletin 15, design is defined as, "the combination of elements that create the form, plan, space, structure, and style of a property…from conscious decisions…" (1991:44). Design relates to not only the facets of a single building or structure, but how the system of buildings, sites, structures, and districts were all arranged spatially. While generally applied to built, and extant, properties and cultural landscapes, even archaeological signatures of existing spatial structure could ensure integrity for a property under design. If a property is thought to be eligible under C, then design integrity is assessed by the presence or absence of the physical components of a property or site design. Hardesty and Little (2000:48) state that Criterion D can apply to both intra- and inter-site patterning through the spatial arrangement of features at multiple scales. Destruction of this spatial patterning through disturbances such as flood, demolition, vandalism, or other such physically destructive activities that removed or altered subsurface deposits would affect this integrity statement.

Setting: According to NR Bulletin 15, setting is defined as, "the physical environment of a historic property" (1991:45). What setting is appropriate for assessment is determined by the period of significance for each property, but rarely will be a question for any of the tie cutting-era properties on the North Slope given the lack of modern development. As most of these properties existed in the densely vegetated woodlands of the North Slope, isolated from most other forms of human habitation, there are only a handful of sites that setting (viewshed) has been adversely affected in the last few decades. Hardesty and Little (2000:48) note that the integrity of setting has little impact on assessment of properties determined eligible under Criterion D.

Materials: According to NR Bulletin 15, materials are defined as, "the physical elements that were combined or

deposited during a particular time…in a particular pattern or configuration…" (1991:45). In the case of the North Slope Tie Cutting Industry, the materials include those locally acquired and those imported for construction and maintenance of structures and buildings. These materials can reflect how the loggers viewed, used, and shaped their local environment and then supplemented this availability with imported goods. Integrity for materials then should be assessed by the presence of these physical materials to relate to the significance criteria. Hardesty and Little (2000:48) suggest that 'materials' for sites eligible under Criteria D refers to the archaeological assemblage as a whole.

Workmanship: According to NR Bulletin 15, workmanship is defined as, "the physical evidence of the crafts of a particular culture or people during any given period…" (1991:45). Log cabins are perhaps the most ubiquitous component of the tie cutting cultural landscape, and these resources physically represent the conscious decisions of their builders and evidence of cultural tradition. Many of these cabins contain hand-carved features such as shelves, door latches, window closures, that are representative of an individual and personal adaptation. Properties retaining integrity of workmanship must maintain enough of the structure to represent these construction methods. Applicability of workmanship integrity to properties determined eligible under Criteria D is variable and dependent upon the research questions ventured.

Feeling: According to NR Bulletin 15, feeling is defined as, "a property's expression of the aesthetic or historic sense of a particular period of time" (1991:45). This is perhaps the least quantifiable of all the integrity aspects, relying purely on a subjective personal assessment. In this case study most sites will likely still express a sense of feeling associated with the tie cutting industry given the lack of large-scale modification of the environment.

Association: According to NR Bulletin 15, association is defined as, "the direct link between an important historic event or person and a historic property" (1991:45). As noted by Hardesty and Little (2000:48), this consideration applies to properties that are in the same location as the event/activity and is intact enough to convey that association. Not only do properties on the North Slope clearly convey association with the significant tie industry, they also are clearly associated with the construction of the nation's first transcontinental railroad. This is perhaps the most significant aspect of integrity for all property types and eligibility criteria.

Eligibility Overview

Tie cutting properties on the North Slope of the Uinta Mountains in Utah may be evaluated for eligibility under one or more of the NRHP criteria. Generally, most properties should be evaluated under Criterion A and D, with the best preserved architectural examples judged under Criterion C. As noted earlier, there were only a limited number of locally or regionally significant individuals directly involved in the tie cutting industry. Plus the burden of proof to link an individual to a specific property for eligibility under Criterion B is unlikely due to the lack of expansive historical documents and the relatively anonymous nature of the archaeological deposits.

Tie cutting properties determined eligible to the National Register under Criteria A or D must be in sufficient condition to convey its association with preservation of physical features, archaeological deposits, and spatial arrangement. Historic research, in association with the archaeological materials on-site, can provide the linkages necessary to determine if a site is indeed eligible for its association with broad patterns of history. An archaeological site may be eligible under Criteria A if the cultural deposits retain primarily integrity of location, setting, and association. An ineligible property under Criteria A or D may possess poorly preserved features and the inability to relate to its significance, such as a ruined bridge along a historic tie cutting road. If a bridge, for example, is largely collapsed and degraded, is of a common type, and there are no significant cultural deposits

associated, then it likely is not eligible under Criteria A, C, or D.

For Criterion B considerations, a property must possess a direct linkage to a significant person(s) through historical research and/or the archaeological material located on site. There is the possibility of historic inscriptions bearing the mark of the identified significant individuals both inside the cabin and through arborglyphs/dendroglyph on the surrounding trees. A historic arborglyph bearing the mark of a significant person might not be eligible under Criterion B alone, except as perhaps an object. As trees are organic objects and likely to not last more than a 150 years, on average, then their listing under Criterion B is not suggested. While there are some identified significant individuals associated with the North Slope, their association with a specific camp or commissary is limited.

Under Criterion C, the structure or buildings must be of good condition and able to convey the significance of its architecture, and also retain integrity of location, design, setting, materials, workmanship and association, with lesser emphasis on feeling. A structure must be in its original location (given the lack of portable structures in this area), and retain a majority of its structural elements such as any significant architectural features including roof truss, porches, additions, and window/wall placement. Internal arrangement and space is of less importance to assessing integrity than the structure itself. Generally, archaeological sites lacking standing architecture should be assessed under Criteria A or D, not C, exceptions may include properties with spatial organization or other considerations as judged by a professional.

Finally, Criterion D eligibility determinations should first consider the integrity of surface and subsurface archaeological deposits. If a site has been severely impacted by modern disturbance (road construction, well pads, housing, bulldozing, etc) resulting in a loss of spatial (vertical and horizontal) provenience, then there is limited data potential as a significant component of that past culturally activity has been lost. Even disturbed cultural material could provide some information on the age, association, and function of property or its features, but if several historical periods are represented and now mixed, the site is likely not eligible under Criterion D. A second consideration under Criterion D should be the amount and diversity of cultural material present on-site. If the site consists of only a handful of sanitary cans of exact style and function, then there really is limited data potential, unless perhaps looked at as part of a system of deposition relating to a specific cultural activity. Most domestic sites and isolated finds should be judged under Criterion D, but also there could be eligible properties within transportation, processing, and oversight and management property types.

In order for sites to be eligible under Criteria D, they must contain sufficient material to address pertinent research questions (Figure 13). Primarily sites with single-period deposits, with limited mixing of materials are the most significant resource, as they can more accurately address specific questions. However, sites with multi-period deposits could be analyzed on a broader scale, or through discovery of intact single-period deposits through subsurface archaeological testing. Sites with significant looting and other forms of disturbance limit the amount of data potential under Criteria D, though care must be taken in assessing the site-wide single and cumulative effect of such activity. For instance, a single cabin domestic site that has been heavily looted might no longer retain eligibility, but if there is a multi-cabin domestic site where only one feature has been disturbed it could still provide significant information from the other areas.

Summary of Eligibility Considerations by Property Type
Currently there are over 230 identified properties associated with the Tie Cutting industry on the North Slope of the Uinta Mountains. Of these, 142 are determined eligible, 22 are determined not eligible, and another 65 are either undetermined or unevaluated for the NRHP. In order to formally be listed through this multiple property

context, these sites, regardless of formal determinations, need to be reassessed given the discussions of integrity and eligibility in this document. Future recordings of sites in this area need to incorporate the themes of this document to adequately judge eligibility versus the *ad hoc* means of determining eligibility thus far. Most properties that have been moved from their original location, and/or lacking integrity under the majority of the seven criteria expressed earlier are not eligible to the NRHP. Individual objects such as those generally identified as isolated finds are not of sufficient significance for individual NRHP listing, but might qualify as part of a district as they relate to an overall system. These individual finds should be adequately recorded in-field to provide data for formal eligibility determination on a large-scale, or for other research objectives. Finally, any sites under 50 years old are not generally eligible for the NRHP unless they are of exceptional significance, which at this time there are no known examples given the end of tie cutting in the 1940s-1950s. Documentation of all cultural material in the Uintas adds to our understanding of the historic tie cutting industry, whether the resources are eligible or not.

Procurement Properties

Procurement properties are not as common as other types on the North Slope, and judging eligibility is difficult given the nature of the sites. As noted earlier, these properties are largely the organic residue of past tie cutting activity including stump fields, abandoned products, etc. While currently limited in the database, greater awareness of these property types to land managers and archaeologists will lead to better and more accurate recording and documentation. Properties must possess some level of physical integrity to demonstrate and convey their significance. For instance, if several stacks of parked ties or cordwood have degraded to such a point as they are not even recognizable, they have lost their ability to convey significance under A, but their location alone may be significant under D. In order for these property types to be eligible for Criteria A they must possess a clear association with the broad patterns of history for the established time periods. There is a much smaller likelihood of preservation of properties associated with the earliest logging on the North Slope during the 1860s-1870s, as organic degradation leads to their disappearance. Thus, procurements sites from this period should be given extra consideration. Rarely would these sites be eligible under Criteria B or C. Finally, under Criteria D, these sites must possess enough integrity in order to provide a significant source of data. Stump fields in particular could have a significant amount of data potential in past environmental reconstructions and other historical ecology frameworks.

Domestic Properties

Domestic properties are the most common property type within the North Slope, and eligibility could be judged under all four criteria, with emphasis on A, C, and D. Rarely are these sites to be judged under Criteria B, unless associated with D.M. Wilt, William Sloan or others of that importance. For these property types to be eligible for Criteria A, they must be able to convey a clear association with the broad patterns of history for the established time periods. There is a much smaller likelihood of preservation of habitation features from the earliest period on the North Slope during the 1860s-1870s, as organic degradation leads to their disappearance. Thus, identified domestic properties from this period should be given extra consideration. In addition, many cabins were likely re-used by later individuals, creating a palimpsest of occupations and material culture. Under Criteria C, domestic properties must have enough well-preserved architecture to document the types, forms, and methods of construction. Some cabin sites recorded in the project area have undergone alterations, but nearly all are within the period of significance. For instance, it appears that the splash dam at Mill Creek (42SM71) existed before establishment of the Standard Timber Company and was readapted in 1912-1913. Unfortunately, several historic tie cutter cabins have been altered in the last few years by recreationists who view these resources as public domain. While prosecution of these individuals for vandalism of historic properties is ongoing, their alterations (which include construction of metal roof, installation of modern windows and doors, reconstruction

of porches, etc.) have significantly altered these structures making them no longer eligible under Criteria C. Due to the scope of these alterations there is little potential to remove these additions without damaging the structure further. Finally, under Criteria D, these sites must possess a diverse and largely intact archaeological assemblage, with the presence of subsurface features providing more significance. Cultural mixing of deposits can hinder some research questions, and heavily mixed deposits on domestic sites might preclude listing under D.

Transportation Properties

Transportation properties are common on the North Slope, but often are not recorded formally as many are still in active use by the Forest Service and the public. Most transportation properties should be judged as districts or as a single complex with many individual components. For example, the construction of bank improvements for tie drives should not be judged individually but as part of an overall system network, with each component (piling, bridge, support, etc.) being judged as contributing or non-contributing as part of a district. Eligibility should be judged under A primarily, with fewer sites eligible under C and D. One major exception to this summary statement exists, that is the Hilliard and Howe Feeder Flumes located in the Bear River drainage. As mentioned earlier, the Howe Feeder Flume is already listed on the NRHP as a District, and is eligible largely under A and D. There is a potential for listing under B, given the connection to William Sloan. Generally, however, most transportation sites will be eligible under A and D, or even C, but rarely B. For these properties to be eligible for Criteria A, they must be able to convey a clear association with one of the contextual eras within the period of significance as established by the MPS. If the transportation system has been heavily modified after the significance period, then the site would not be eligible under A. Under Criteria C, transportation properties must include physically recognizable and intact architectural components or design elements that can convey significance. For Criterion D, if there are domestic refuse or encampments associated with the tie drives this should be judged as the discussion under domestic properties.

Processing Properties

Processing properties are difficult to associate to the tie cutting industry, as they sometimes produced other types of finished log goods such as milled lumber and shingles. Eligibility could be judged under all four criteria, with emphasis on A and D, with lesser emphasis on B and C. Earlier sawmills operated Judge W.A. Carter, a steam sawmill on Upper Henry's Fork, or later 1940s-1950s sawmills, should be evaluated outside this MPS, but could be informed by this overall context. For these property types to be determined or listed as eligible under Criteria A, they must be directly associated with the tie cutting industry (1867-1950) outlined in this document in addition to their ability to convey that significance. Criteria B should not be used generally to judge eligibility, as Standard Timber Company under D.M. Wilt did not operate a sawmill on the North Slope though one was located at Millis, Wyoming (south of Evanston). Criteria C might be a useful rubric for determining the eligibility of standing sawmills properties, though none exist currently in the identified sites, or properties with sufficient amount of spatial organization for interpretation and analysis. Finally, under Criterion D, there is potential to answer research questions from processing sites that could include the types and amounts of waste material, location of the portable sawmill sites, or any associated material culture from either domestic activity or industrial activity. Properties eligible under Criterion D must follow the same criteria as under the Domestic property type explained above.

Oversight & Management Properties

Oversight and Management Properties are limited in number, and most have already been identified by archaeologists and historians. These sites should be considered for eligibility under A, C, and D, with lesser emphasis placed on B. Many of these oversight properties can likely be judged under two historical contexts for the tie cutting industry, but also Forest Service administrative facilities. Under Criterion A, these properties must

be able to convey their association with the tie cutting industry within the period of significance. For standing structures such as guard stations, if there has been substantial alteration to these properties since the close of the tie cutting industry, it may not be eligible under Criterion A. Architecturally these guard stations should be judged under Criterion C as they are definitely evidence of the historic period, and the design and style of the United States Forest Service. Hewinta Guard Station, in contrast, was actually constructed by tie cutters and thus does not conform to the Forest Service plan. For Criterion D, any property must contain significant material culture evidence either on the surface or in intact subsurface deposits that date within the period of significance.

Isolated Finds

It is possible for locations of isolated finds to be considered eligible for the NRHP, as long as the object(s) are not removed from their original location. As this nomination uses established Utah archaeological site guidance on what is considered a site versus an isolated find (10 artifacts within 10 meters or 15 artifacts of two classes within 15 meters), there is potential for an area, but not site, to be eligible under Criteria A and D predominantly. For a single object to be eligible for the NRHP it must be left in its original location, as generally objects removed from their setting and placed in a museum do not retain integrity. Examples of eligible objects could be an abandoned wagon or tool, boundary marker, or other such unique features meeting both the association with the tie cutting industry and within the period of significance.

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Name of Property	*Utah*
County and State	*Tie Cutting Industry of the North Slope of the Uinta Mountains, Utah (1867-1940s)*
Name of multiple listing (if applicable)	

Section number G Page 25

Section G. Geographic Data

The area defined for this nomination is a limited portion of the North Slope of the east/west trending Uinta Mountains. As one of only a few east-west trending mountain ranges in the continental United States, the Uinta Mountains span over 120 miles from Coalville, Utah on the west to the Green River on the east. Topographically, the North Slope of the Uintas rises from the Great Plains at 6800 feet to the crest of the High Uintas Wilderness area of King's Peak at 13,528 feet. On the backside, the south slope of the Uinta Mountains forms the northern boundary of the arid Uintah Basin. Prominent waterways of the North Slope, which also figured significantly in the historic-era logging, includes Bear River, Mill Creek, and the Black's Fork, Smith's Fork, and Henry's Fork of the Green River. Loggers would use these waterways to float finished ties or other products northward to market along the railroad grades in Wyoming.

Section H. Identification and Evaluation Methods

This Multiple Property Documentation Form was principally completed by historical archaeologist Dr. Christopher Merritt, formerly of the Uinta-Wasatch-Cache National Forest (UWCNF). This project included a literature search of the UWCNF Heritage Program site and report files, Region 4 of the United States Forest Service, and the Utah State Historic Preservation Office archaeological records. In addition, Merritt contacted interested archaeologists who have dedicated portions of their career to compiling primary and secondary historical resources, documenting sites, and coordinating efforts on the North Slope tie cutting industry. Particularly, James E. Ayres of Tucson, Arizona, and Evanston, Wyoming, has spent the last fifty years working and studying the North Slope and created a spatially and temporally expansive database on sites and their changes over time. Ayres has documented in detail 150 sites within the Black's Fork and Bear River Drainages, most dating to the 1867-1950 period. Currently only a small percentage of the North Slope has been inventoried for cultural resources, with thousands of acres within the High Uinta Wilderness area which is rarely subjected to Section 106-based surveys due to the lack of development. This limits the size of the information database in regards to tie cutting properties but with every passing year additional acreage is surveyed and sites recorded (Figure 14).

The United States Forest Service initiated early formal cultural resource inventories in the late 1970s largely for timber sales. In the 1980s, timber sale surveys in addition to oil and gas development along Henry's Fork added several thousand acres to the inventory. During the 1990s and 2000s, most of the survey work on the North Slope has been associated with habitat improvement projects, including prescribed fuels reduction and timber salvage in the areas ravaged by pine beetle epidemics. In total, currently 34,285 acres of the 439,758 total acres of this nomination has undergone cultural resource inventory, whether intensive or reconnaissance level, and documented 230 sites. Nearly all of this work has been completed by USFS archaeologists. Approximately 150,000 acres of this total is located within the High Uintas Wilderness area, which is both difficult to access and has a low amount of current survey completed. There is currently exploration for oil and gas deposits in the Bear River drainage resulting in a new wave of cultural resource inventories, this time being completed largely by contract firms with little knowledge of the area's rich tie cutting industry heritage. This document will provide a road map for these future undertakings, and provide a solid framework for determining eligibility of resources encountered during survey work.

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Figure 1: Outline of Multiple Property Documentation Form coverage for Tie Hack Industry, 2013.

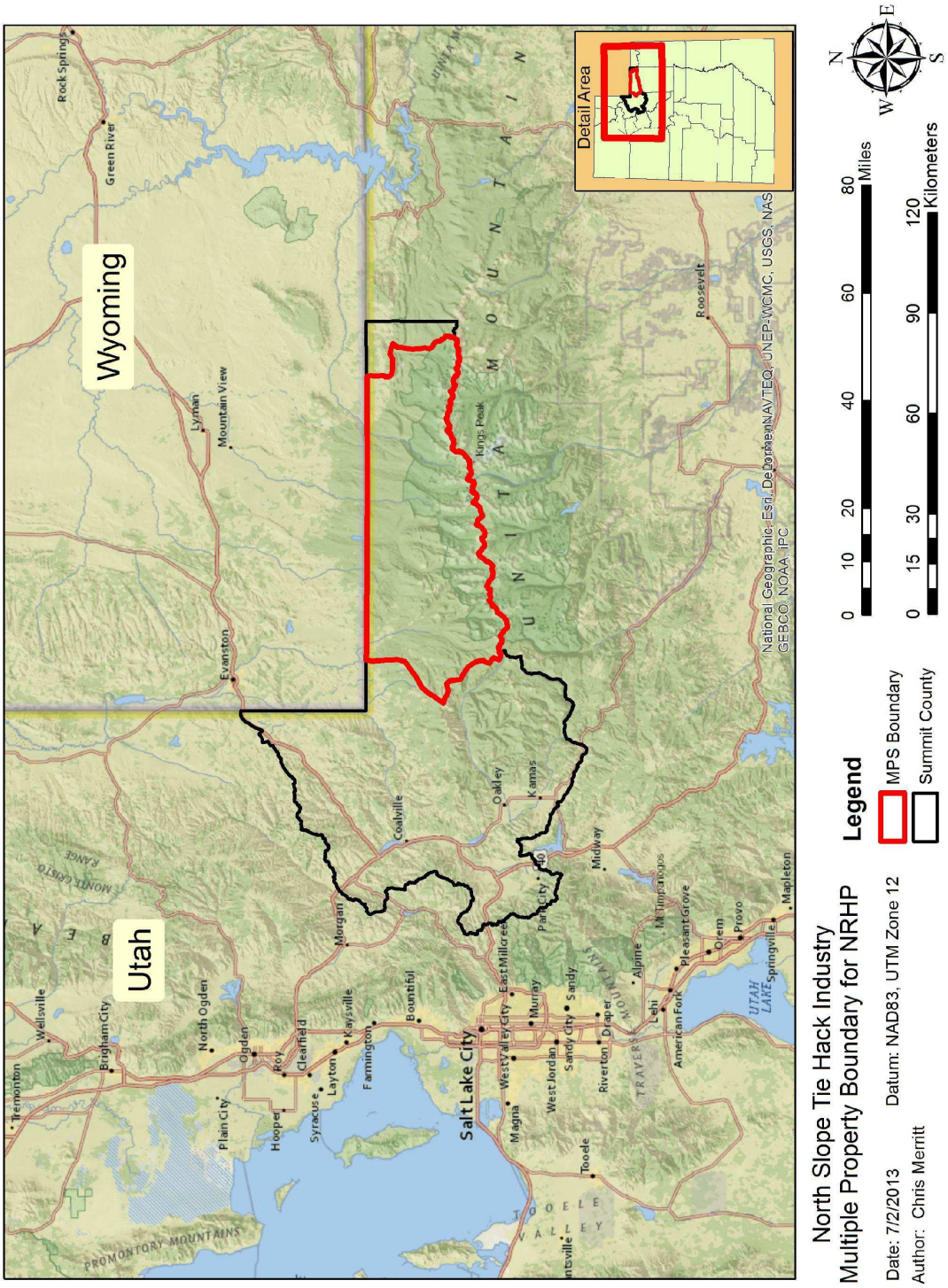

Figure 2: Outline of Multiple Property Documentation Form coverage for Tie Hack Industry, showing land ownership, 2013.

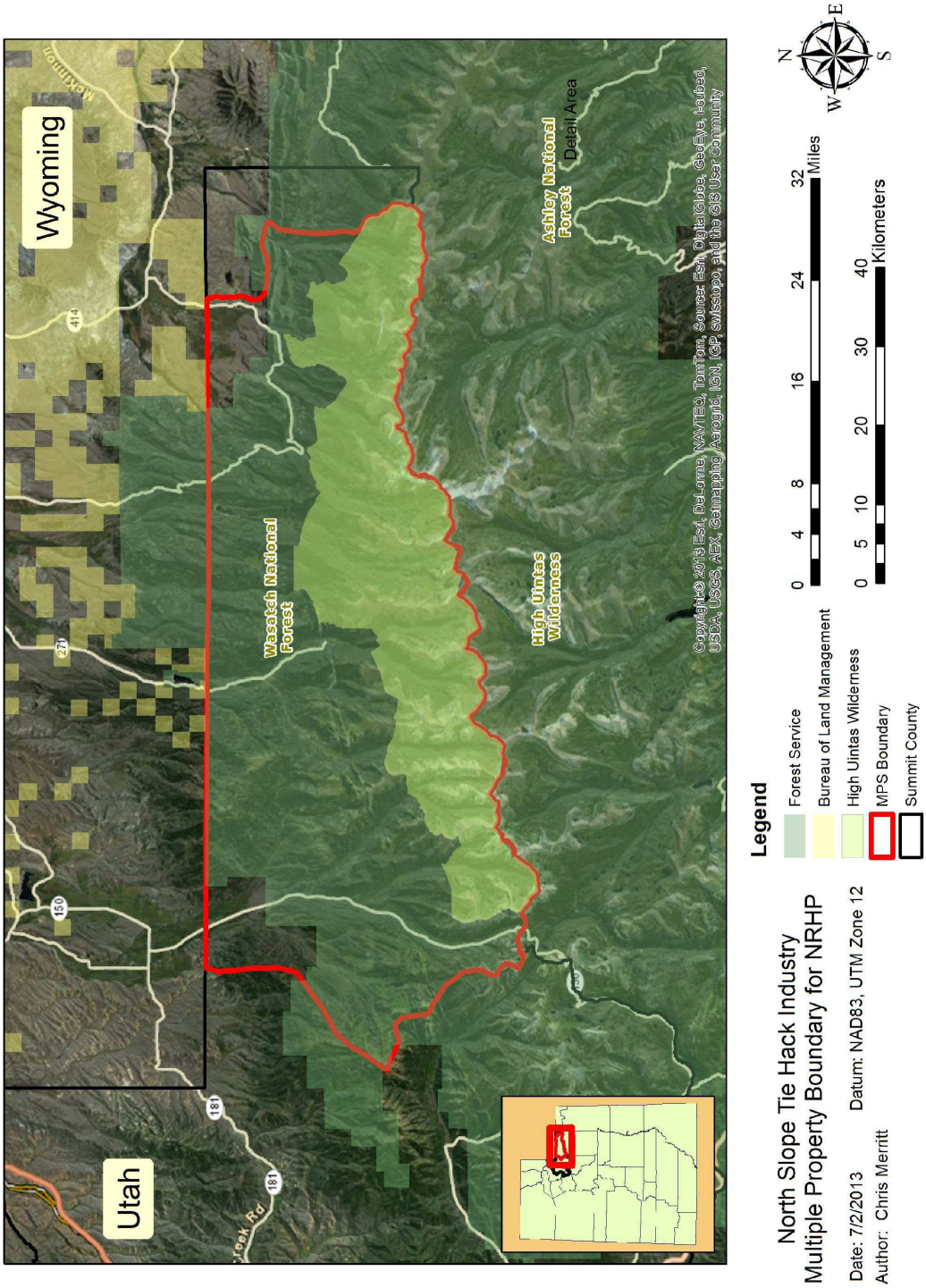

Figure 3: A tie hack at work, using a broad axe to hew a fallen lodgepole, ca. 1912. Baker and Hauge (1913).

Figure 4: A horse-drawn tie hauler sled caught in snow, ca. 1912. Baker and Hauge (1913).

Figure 5: Hilliard Flume and Charcoal Kilns, 1877, from *Frank Leslie's Illustrated Newspaper*, November 17, 1877, pg. 173.

Figure 6 Standard Timber Company, Mill Creek Commissary, ca. 1912. Baker and Hauge (1913).

Table 1: "Henry's Fork Tie Camp" demographics from the 1930 Federal Census.

Birthplace	Number
Foreign-Born	**31**
Sweden	*20*
Finland	*6*
Norway	*2*
Germany	*1*
Canada-French	*1*
Canada-English	*1*
Ireland	*1*
United States	**32**
Wyoming	*5*
Colorado	*5*
Utah	*3*
Arkansas	*2*
Wisconsin	*2*
North Carolina	*2*
Idaho	*2*
Kentucky	*2*
Ohio	*2*
Oklahoma	*1*
Minnesota	*1*
Tennessee	*1*
Missouri	*1*
Indiana	*1*
Iowa	*1*
Illinois	*1*

Table 2: Sites Recorded on North Slope and Property Type Designation.

Site #	Property Type	Site Type	Site Date(s)	Eligibility	Last Recording Date	Notching Noted	# of Cabins
42SM002	Domestic	Cabin	Post-1908	Eligible	2001		1
42SM003	Domestic	Cabin		Eligible	2001	Saddle	1
42SM004	Domestic	Cabin & Tie Deck		Eligible	2001	Saddle	1
42SM005	Domestic	Cabin		Eligible	1999	Saddle	1
42SM006	Domestic	Cabin		Eligible	2003	Saddle	4
42SM007	Domestic	Cabin (?)		Undetermined	1977		1
42SM008	Domestic	Cabin		Undetermined	1977		1
42SM009	Domestic	Cabin	1912	Undetermined	1977		1
42SM013	Domestic	Cabin	1920s-1940s	Eligible	2002	False-Notching	6
42SM014	Domestic	Cabin	1900-1929	Eligible	2002		8
42SM015	Domestic	Cabin		Undetermined	1978		1
42SM016	Domestic	Cabin		Undetermined	1979		1
42SM017	Domestic	Cabin		Eligible	2005		1
42SM018	Domestic	Cabin		Undetermined	1979		1
42SM019	Domestic	Cabin		Undetermined	2002		1
42SM021	Domestic	Commissary	1927-1936	Eligible	2002		14
42SM022	Multicomponent	Cabins and Splash dam		Eligible	2002		4
42SM023	Domestic	Commissary	1910s-1930s	Eligible	2000		12
42SM024	Domestic	Cabin		Eligible	1979		1
42SM025	Domestic	Cabin		Eligible	2002		9
42SM026	Multicomponent	Cabin		Undetermined	1979		1
42SM056	Multicomponent	Cabin		Undetermined	1979		1
42SM058	Domestic	Cabin		Undetermined	2001		1
42SM059	Domestic	Cabin		Undetermined	2004		4
42SM061	Domestic	Cabin	1890-1920	Not Eligible	2002		1
42SM062	Domestic	Cabin		Not Eligible	2002		1
42SM063	Domestic	Cabin		Not Eligible	2002		1
42SM064	Domestic	Cabin		Not Eligible	2002	Half-dovetail	1
42SM066	Domestic	Cabin		Eligible	1999	Saddle	2
42SM067	Domestic	Cabin & Log Deck		Eligible	1999		2
42SM070	Domestic	Commissary		Eligible	2004		8
42SM071	Transportation	Splash Dam		Eligible	2001		1
42SM072	Domestic	Cabin		Undetermined	2002		1
42SM073	Domestic	Cabin		Undetermined	2004		1

42SM074	Domestic	Cabin		Eligible	2001		5
42SM075	Transportation	Road		Not Eligible	2006		0
42SM076	Domestic	Cabin		Not Eligible	2005		2
42SM077	Domestic	Cabin		Undetermined	2004		5
42SM078	Domestic	Cabin		Undetermined	2005		7
42SM094	Domestic	Cabin		Eligible	2005		1
42SM095	Domestic	Cabin		Not Eligible	2001		1
42SM096	Domestic	Cabin		Eligible	2001		1
42SM097	Domestic	Commissary	1867-1880s	Eligible	2000		9
42SM103	Multicomponent	Flume		Eligible	2000		10
42SM104	Domestic	Trash Dump		Not Eligible	2005		0
42SM105	Domestic	Cabin		Eligible	2002		1
42SM106	Processing	Portable Sawmill	1929-1956	Not Eligible	2002		0
42SM107	Processing	Portable Sawmill	1929-1956	Not Eligible	2002		0
42SM108	Domestic	Cabin		Eligible	2001		1
42SM111	Oversight & Management	Guard Station		Eligible	2003		9
42SM112	Domestic	Cabin	1910s-1920s	Eligible	2001		3
42SM113	Domestic	Cabin		Undetermined	2001		3
42SM114	Domestic	Cabin	1890-present	Eligible	2000	False-Notching	2
42SM116	Domestic	Cabin		Eligible	2002		1
42SM117	Domestic	Cabin	1880s-1920s	Eligible	1998		2
42SM118	Domestic	Cemetery	1910s-1930s	Eligible	2010		0
42SM119	Domestic	Cabin	1929	Eligible	2002	Square Notching	1
42SM120	Domestic	Cabin		Not Eligible	1985		1
42SM121	Transportation	Splash Dam		Unevaluated	1985		1
42SM122	Transportation	Splash Dam		Unevaluated	1985		1
42SM123	Domestic	Cabin	1920s-1940s	Eligible	2002		2
42Sm125	Oversight & Management	Guard Station	1928-present	Unevaluated	1988		2
42SM126	Domestic	Cabin		Eligible	2002		2
42SM127	Multicomponent	Cabin & Dam		Unevaluated	1985		3
42SM128	Domestic	Cabin & Barn	1908-1920	Unevaluated	1985		4
42SM149	Domestic	Cabin	1880s-1920s	Eligible	2001	Various	6
42SM150	Domestic	Cabins & Barn		Unevaluated	1986		3
42SM151	Domestic	Cabin		Eligible	2001		1
42SM156	Domestic	Cabin	1873-1904	Eligible	2000		1
42SM164	Domestic	Cabin		Unevaluated	1988		1
42SM167	Domestic	Cabin		Unevaluated	1989		4

42SM174	Domestic	Cabin	1912-1920s	Eligible	2004		9
42SM191	Domestic	Cabin		Eligible	2002		1
42SM201	Domestic	Cabin	1908-1940s	Eligible	2002		1
42SM202	Domestic	Cabin		Eligible	1992		1
42SM210	Domestic	Cabin		Eligible	1994		6
42SM211	Domestic	Cabin	1915-1929	Eligible	2001		6
42SM275	Domestic	Cabin	1900-1929	Eligible	1999		2
42SM276	Domestic	Trash Dump		Not Eligible	2005		0
42SM277	Domestic	Cabin	1860s-1910s	Unevaluated	2000		2
42SM278	Domestic	Cabin	1880s-1920s	Eligible	2002		1
42SM279	Domestic	Cabin		Eligible	2000		1
42SM289	Domestic	Cabin		Eligible	2001		2
42SM290	Domestic	Cabin	1908-1920	Eligible	2001		2
42SM291	Domestic	Cabin	1880s-1920s	Eligible	2001	V-Notch	2
42SM300	Domestic	Cabin	1916-1920	Eligible	2001	V-Notch	2
42SM301	Transportation	Loading Deck	1880s-1920s	Eligible	2001		0
42SM302	Transportation	Float Camp		Eligible	2005		0
42SM303	Domestic	Cabin	1880s-1920s	Eligible	2001		3
42SM304	Domestic	Cabin		Eligible	2003		2
42SM305	Domestic	Cabin		Eligible	2003		1
42SM306	Domestic	Cabin		Eligible	2001		1
42SM307	Domestic	Cabin		Eligible	2001	Square Notching	1
42SM308	Domestic	Trash Dump		Not Eligible	2002		0
42SM318	Oversight & Management	FS Telephone		Undetermined	2001		0
42SM319	Oversight & Management	FS Telephone		Undetermined	2001		0
42SM320	Oversight & Management	Cabin		Eligible	2002		1
42SM321	Domestic	Cabin		Eligible	1999		1
42SM322	Transportation	Bank Improvement		Eligible	2001		0
42SM323	Domestic	Cabin		Eligible	2002		2
42SM324	Domestic	Cabin		Eligible	2002		1
42SM325	Domestic	Cabin		Eligible	2001		1
42SM326	Domestic	Cabin		Eligible	2000		1
42SM327	Domestic	Cabin		Eligible	1999		1
42SM328	Domestic	Cabin	1908-1920s	Eligible	2002		3
42SM329	Domestic	Cabin	1909-1930s	Eligible	2002		1
42SM332	Domestic	Cabin		Undetermined	2000		4

42SM333	Domestic	Cabin	1910s-1930s	Eligible	2001		2
42SM334	Domestic	Cabin		Eligible	2001	Saddle	1
42SM335	Procurement	Parked Ties		Not Eligible	1999		0
42SM336	Domestic	Cabin	1890s-1920s	Eligible	1999	Saddle	1
42SM337	Domestic	Cabin		Undetermined	1999		3
42SM338	Domestic	Cabin		Undetermined	2002		4
42SM339	Domestic	Cabin		Undetermined	2002		2
42SM340	Multicomponent	Cabin		Undetermined	2002		9
42SM341	Domestic	Cabin		Undetermined	2002		3
42SM342	Domestic	Cabin		Undetermined	2002		3
42SM343	Transportation	Road		Eligible	2002		0
42SM344	Domestic	Trash Dump		Not Eligible	2004		0
42SM345	Domestic	Cabin		Eligible	2002		5
42SM346	Domestic	Cabin		Undetermined	2002		5
42SM347	Domestic	Cabin		Undetermined	2002		2
42SM348	Domestic	Cabin		Undetermined	2002		2
42SM349	Domestic	Cabin	1860s-1920s	Undetermined	2004		4
42SM350	Domestic	Cabin	1880s-1940s	Eligible	2002		6
42SM351	Domestic	Cabin	1880s-1950s	Eligible	2002		1
42SM352	Domestic	Cabin		Eligible	2002		6
42SM353	Domestic	Cabin		Eligible	2001		1
42SM354	Processing	Portable Sawmill		Not Eligible	2001		0
42SM355	Transportation	Earthen Dam		Eligible	2002		0
42SM356	Domestic	Cabin		Eligible	2002		9
42SM357	Transportation	Splash Dam		Eligible	2001		0
42SM359	Processing	Portable Sawmill		Eligible	2002		0
42SM362	Domestic	Cabin		Eligible	2002		1
42SM364	Processing	Portable Sawmill		Eligible	2002		0
42SM365	Domestic	Cabin		Eligible	2002		4
42SM366	Domestic	Cabin		Eligible	2002		6
42SM367	Domestic	Cabin		Eligible	2002		3
42SM368	Domestic	Cabin		Eligible	2002		1
42SM369	Transportation	Bridge		Eligible	2002		0
42SM370	Multicomponent	Portable Sawmill		Eligible	2002		1
42SM371	Domestic	Cabin		Eligible	2002		1
42SM372	Domestic	Cabin		Eligible	2002		7
42SM373	Domestic	Cabin		Eligible	2002		2
42SM374	Domestic	Cabin	1860s-1920s	Eligible	2002	V-Notch	1

42SM375	Domestic	Cabin		Eligible	2002		2
42SM376	Transportation	Bank Improvement		Eligible	2002		0
42SM377	Domestic	Cabin		Eligible	2002		2
42SM378	Processing	Portable Sawmill	1930s-1950s	Eligible	2002		1
42SM381	Multicomponent	Portable Sawmill		Eligible	2002		1
42SM382	Multicomponent	Portable Sawmill		Eligible	2002		1
42SM384	Processing	Portable Sawmill		Eligible	2002		0
42SM385	Processing	Portable Sawmill		Eligible	2002		0
42SM386	Processing	Portable Sawmill		Eligible	2002		0
42SM387	Processing	Portable Sawmill		Eligible	2002		0
42SM388	Processing	Portable Sawmill		Eligible	2002		0
42SM389	Processing	Portable Sawmill		Eligible	2002		0
42SM390	Domestic	Cabin		Eligible	2002		2
42SM393	Domestic	Cabin		Undetermined	2002		1
42SM394	Domestic	Cabin		Undetermined	2002		1
42SM395	Domestic	Cabin		Undetermined	2002		1
42SM396	Domestic	Cabin		Undetermined	2002		1
42SM397	Domestic	Cabin		Undetermined	2002		1
42SM398	Domestic	Cabin		Undetermined	2002		1
42SM399	Domestic	Cabin		Undetermined	2004		1
42SM400	Domestic	Cabin		Undetermined	2004		7
42SM401	Domestic	Cabin		Undetermined	2004		2
42SM402	Transportation	Splash Dam		Eligible	2002		0
42SM403	Domestic	Cabin		Undetermined	2002		1
42SM404	Processing	Portable Sawmill		Undetermined	2005		0
42SM405	Processing	Portable Sawmill		Undetermined	2005		0
42SM406	Processing	Portable Sawmill		Undetermined	2005		0
42SM407	Processing	Portable Sawmill		Undetermined	2005		0
42SM408	Domestic	Cabin		Not Eligible	2002		1
42SM409	Domestic	Cabin		Undetermined	2002		1
42SM410	Domestic	Cabin		Undetermined	2005		2
42SM411	Domestic	Cabin		Undetermined	2005		1
42SM412	Domestic	Cabin		Undetermined	2005		8
42SM413	Transportation	Dam		Eligible	2002		0
42SM414	Domestic	Cabin		Undetermined	2004		2
42SM415	Domestic	Cabin		Undetermined	2004		2
42SM416	Domestic	Cabin		Undetermined	2002		2
42SM420	Processing	Portable Sawmill		Not Eligible	2004		0

42SM421	Domestic	Cabin		Not Eligible	2002		1
42SM422	Domestic	Cabin		Eligible	2002		5
42SM423	Domestic	Cabin		Undetermined	2002		2
42SM424	Transportation	Corduroy Road		Undetermined	2004		0
42SM426	Oversight & Management	FS Telephone		Undetermined	2004		0
42SM428	Procurement	Tie Deck		Undetermined	2005		0
42SM429	Domestic	Cabin		Undetermined	2004		2
42SM430	Oversight & Management	Guard Station		Eligible	1985		1
42SM448	Domestic	Cabin		Eligible	2010		2
42SM449	Domestic	Cabin		Eligible	2002		1
42SM465	Domestic	Cabin		Eligible	2005		1
42SM467	Domestic	Cabin		Eligible	2003		1
42SM468	Domestic	Cabin		Undetermined	2003		1
42SM469	Domestic	Cabin		Eligible	2003		3
42SM470	Domestic	Cabin		Eligible	2003		1
42SM471	Transportation	Road		Eligible	2001		0
42SM472	Procurement	Parked Ties		Not Eligible	2003		0
42SM473	Domestic	Cabin		Eligible	2003		8
42SM474	Transportation	Road		Eligible	2003		0
42SM475	Domestic	Cabin		Eligible	2003		2
42SM484	Domestic	Cabin		Eligible	2002		2
42SM488	Processing	Portable Sawmill		Not Eligible	2002		0
42SM489	Domestic	Cabin		Eligible	2004		1
42SM490	Domestic	Cabin		Eligible	2005		5
42SM491	Domestic	Cabin		Eligible	2006		1
42SM492	Domestic	Cabin		Eligible	2002		1
42SM493	Procurement	Tie Deck		Not Eligible	2005		0
42SM499	Transportation	Road		Eligible	2005		0
42SM500	Transportation	Road		Eligible	2005		0
42SM546	Domestic	Cabin		Eligible	2006		1
42SM547	Transportation	Road		Eligible	2006		0
42SM548	Transportation	Road		Eligible	2006		0
42SM549	Domestic	Cabin		Eligible	2006		1
42SM557	Domestic	Cabin		Eligible	2007		1
42SM567	Domestic	Cabin	1867-1918	Eligible	2010		3
42SM568	Domestic	Cabin		Eligible	2010		1
42SM569	Domestic	Cabin		Eligible	2010		1

42SM570	Domestic	Cabin		Eligible	2010		3
42SM572	Domestic	Cabin		Eligible	2010		1
42SM573	Domestic	Cabin		Eligible	2010		1
42SM574	Domestic	Cabin		Eligible	2010		1
42SM575	Domestic	Cabin	1890s-1940s	Eligible	2010		2
42SM576	Transportation	Road		Eligible	2010		0
42SM577	Domestic	Cabin	1867-1890	Eligible	2010		1
42SM579	Domestic	Cabin	1867-1890	Eligible	2010		1
42SM580	Domestic	Cabin	1890-1922	Eligible	2010		3

Table 3: Property types and examples for the North Slope Tie Hacking MPS.

Property Type	Examples
Procurement	Stump fields, waste piles, slash, abandoned products
Domestic	Commissaries, satellite camps, logging camps, trash dump, trash scatters
Transportation	Roads, waterway developments, splash dams, flumes, telephone/electrical lines,
Processing	Sawmills, slabs, sawdust
Oversight & Management	Forest Service guard stations, telephone poles
Isolated Finds	Tools, alcohol containers, horse tack

Table 4: Property types, categories, and applicable NRHP Criteria for North Slope Tie Hacking MPS.

Property Types	**Property Categories**	**NRHP Eligibility Criteria**
Procurement properties	Sites Structures Objects Districts	Criteria A and D, rarely B and C
Domestic properties	Sites Buildings Structures Objects Districts	Criteria A, C, and D, rarely B
Transportation properties	Sites Structures Objects Districts	Criteria A, C, and D, rarely B
Processing properties	Sites Buildings Structures Objects Districts	Criteria A, C, and D, rarely B
Oversight & Management properties	Sites Buildings Structures Objects Districts	Criteria A, C, and D, rarely B
Isolated Finds	Sites Objects Structures	Criteria A and D, rarely B and C

Figure 7: Suicide Park Graves, along Smith's Fork.

Figure 8: Mill Creek Splash Dam, constructed 1870s-1900.

Figure 9: Overview of 1910s-1920s tie hack haul road, above Black's Fork.

Figure 10: Hewinta Guard Station, built 1928.

Figure 11: Overview of 1920s-1930s log cabin on Smith's Fork.

Figure 12: Detail of notching style at Steel Creek Commissary (42SM21).

Figure 13: Corset hook from McKenzie Creek Cabins (42SM374), representing a possibly gendered artifact for research potential.

Figure 14: Currently completed pedestrian surveys on North Slope.